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8/1/67



THE  
CHINA SEA DIRECTORY.

VOL. II.

CONTAINING

DIRECTIONS FOR THE NAVIGATION OF  
THE CHINA SEA,  
BETWEEN SINGAPORE AND HONG KONG.

FIFTH EDITION.

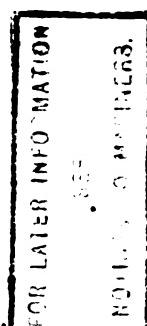
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PRINTERS TO THE KING'S MOST EXCELLENT MAJESTY.  
AND SOLD BY

J. D. POTTER, AGENT FOR THE SALE OF ADMIRALTY CHARTS,  
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# A D V E R T I S E M E N T

TO THE

## FIFTH EDITION.

THE China Sea Directory is published in three volumes.

This volume, the second, deals with the China Sea, proper, between Singapore and Hong Kong, and gives directions for its navigation.

It is compiled principally from the Charts and Sailing Directions of the surveying officers belonging to H.M. Navy and the Indian Marine, mentioned on the following page.

The following authorities also have been consulted:—Horsburgh's Directory; the latest Charts of the Netherlands and French Governments; Instructions Nautiques sur les Mers de Chine, 1894; Derrotero del Archipiélago Filipino, 1879; the Remark Books of H.M. Ships, and information from officers of the Mercantile Marine.

The descriptions of the coast of French Indo-China is almost entirely from the French Sailing Directions mentioned.

As a considerable portion of the China Sea has been only partially surveyed, it should be navigated with caution.

The work was originally compiled by Staff Commanders Reed and King, R.N., and published in the year 1868.

A second edition was prepared by Staff Commander Hitchfield, R.N., in 1879, and a third edition by Staff Commander Hitchfield and Commander Oldham, R.N., 1889. The fourth edition, prepared by Captain C. H. C. Langdon, R.N., of the Hydrographic Department, was published in 1899.

The present, the fifth edition, containing all the information available to date of publication, has been prepared by Captain John Phillips, R.N.

Seamen are invited to transmit to the Secretary of the Admiralty notice of any errors or omissions they may discover, or additional information they may obtain, with a view to the improvement of the work and for the benefit of the mariner.

By the publication of this work, former editions, as well as Supplements or Hydrographic Notices relating to them, also Notices to Mariners, up to and including No. 410 of 1906, are cancelled.

A. M. F.

HYDROGRAPHIC OFFICE,  
*May 1906.*

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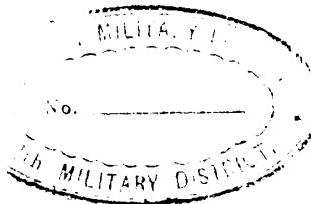
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A GLOSSARY OF SIAMESE WORDS, WHICH SOMETIMES OCCUR  
IN THE CHARTS AND SAILING DIRECTIONS.

<i>Siamese.</i>	<i>English.</i>	<i>Siamese.</i>	<i>English.</i>
Bang .....	Village.	Nam-tem-khraye .....	Full tide.
Bon .....	Upper.	Nam-long .....	Ebbing tide.
Buri .....	City.	Nei .....	In.
Dam .....	Black.	Noi .....	Little, or less.
Deng .....	Red.	Nok .....	Out.
Din niáu .....	Clay.	Nei-kwa .....	Inner.
Din-si-fong .....	Chalk.	Noi-kwa .....	Lesser.
Fai .....	Fire, light.	Nok-kwa .....	Outer.
Hin .....	Rock, Stone.	Pa .....	Forest.
Hatsai .....	Sandbank.	Pak .....	Mouth.
Kau .....	Old.	Pak-nam .....	Mouth of a river.
Khão .....	Mountain hill.	Pom .....	Fort.
Khão .....	White.	Rong-pa-si .....	Custom-house.
Khlon .....	Mud.	Sai .....	Sand, gravel.
Klong .....	Canal or creek.	Sao-thong .....	Flag-staff.
Koh .....	Island.	Tha-leh .....	Sea, lake.
Luk-ma-kok .....	Olives.	Thai .....	Siamese.
Lém .....	Point, promontory.	Thit nua .....	North.
Láng-tao .....	Bar (of a river).	Thit tai .....	South.
Lang .....	Lower.	Thit tawan-ok .....	East.
Lat .....	A cut, short cut.	Thit tawan tok .....	West.
Lek .....	Small.	Thi-thort-samor .....	Anchorage.
Mai .....	New.	Toko .....	Storehouse.
Me-nam .....	River.	Wat .....	Temple.
Muang .....	Town.	Yai .....	Great.
Nam .....	Water, or tide.	Yai-kwa .....	Greater.
Nam khum .....	Rising tide.	Yort .....	Peak.
Nam-ó .....	Rising tide, begin- ning of.		



## SYSTEM OF ORTHOGRAPHY.

*Adopted by the Admiralty for Sailing Directions and Charts.*

As far as has been found possible with existing knowledge, native names are spelt in accordance with the following system, which has been adopted by the principal authorities in Great Britain and by the United States, and has been for some years in process of gradual introduction into all Admiralty Sailing Directions and Charts.

No change is made in the orthography of foreign names in countries which use Roman Letters; thus French, Spanish, Portuguese, Dutch, &c. names will be spelt as by the respective nations.

1. Where native names have been so long written in a form which, though not in accordance with this system, has become familiar to English eyes from being so spelt in all charts and maps, they are retained.

2. The true sound of the word as locally pronounced is taken as the basis of the spelling.

3. An approximation of the sound is alone aimed at. A system which would attempt to represent the more delicate inflections of sound and accent would be so complicated as only to defeat itself.

4. The broad features of the system adopted are that vowels are pronounced as in Italian and consonants as in English, *every letter being pronounced*. Two accents only are used:—

(1) The acute, to denote the syllable on which stress is laid. The use of this is very important, as the sounds of many names are entirely altered by the misplacement of this "stress."

(2) The sign ~ over the letter U to denote the short sound of that vowel under certain circumstances. (See table.)

5. When two vowels come together, each one is sounded, though the result, when spoken quickly, is sometimes scarcely to be distinguished from a single sound, as in *ai, au, ei*.

The amplification of the rules is given on the following pages.

Information is invited as to the proper spelling of native names, so as to produce the nearest approximation to the true sound, by this system.

Letters.	Pronunciation and Remarks.	Examples.
a	<i>ah, a</i> as in <i>father</i>	Java, Banána, Somáli, Bari.
e	<i>eh, e</i> as in <i>benefit</i> ; <i>a</i> as in <i>fate</i>	Tel-el-Kebír, Oléleh, Yezo, Levúka, Peru.
i	English <i>e</i> ; <i>i</i> as in <i>ravine</i> ; the sound of <i>ee</i> in <i>beet</i> . Thus, not <i>Feejee</i> , but	Fiji, Hindi.
o	<i>o</i> as in <i>mote</i>	Tokyo.
u	long <i>u</i> as in <i>flute</i> ; the sound of <i>oo</i> in <i>boot</i> . <i>oo</i> or <i>ou</i> should never be employed for this sound. Thus, not <i>Zooloo</i> or <i>Zoulou</i> , but	Zulu, Sumatra.
—	The shorter sound of the different vowels, when necessary to be indicated, can be expressed by doubling the consonant that follows. The sounds referred to are as follows:—	Yarra, Tanna, Mecca, Jidda, Bonny.*
	The short <i>a</i> as in <i>fatter</i> , as compared with the long <i>a</i> as in <i>father</i> .	
	The short <i>e</i> as in <i>better</i> , as compared with the long <i>e</i> as in <i>fate</i> .	
	The short <i>i</i> as in <i>sinner</i> , as compared with the long <i>i</i> as in <i>ravine</i> .	
	The short <i>o</i> as in <i>sobbing</i> , as compared with the long <i>o</i> as in <i>sober</i> .	
	The short <i>u</i> as in <i>rubber</i> , as compared with the long <i>u</i> as in <i>rubric</i> .	
ü	is the same short sound of <i>u</i> as is denoted by doubling the consonant following, but is used, and only used, where such doubling is impossible, as in case of words where <i>u</i> is followed by two different consonants, as in <i>Tüng</i> , pronounced as the English <i>tongue</i> .	
	Doubling of a vowel is only necessary where there is a distinct repetition of the single sound.	Nuulúa, Oosima.
ai	English <i>i</i> as in <i>ice</i>	Shanghai.
au	<i>ow</i> as in <i>how</i> . Thus, not <i>Foochow</i> , but	Fuchau.
ao	is slightly different from <i>au</i>	Macao.
aw	when followed by a consonant or at the end of a word, as in <i>law</i>	thus Cawnpore.

\* The *y* is retained as a terminal in this word under rule 1. The word is given as a familiar example of the alteration in sound caused by the second consonant.

Letters.	Pronunciation and Remarks.	Examples.
ei	is the sound of the two Italian vowels, but is frequently slurred over, when it is scarcely to be distinguished from <i>ey</i> in the English <i>they</i> , or <i>ei</i> in <i>eight</i> .	Beirút, Beilul.
b	English <i>b</i> .	
c	is always soft, but is so nearly the sound of <i>s</i> that it should be seldom used. If <i>Celébes</i> were not already recognised it would be written <i>Selébes</i> .	Celébes.
ch	is always soft as in <i>church</i> - - - -	Chingchin.
d	English <i>d</i> .	
f	English <i>f</i> . <i>Ph</i> should not be used for the sound of <i>f</i> . Thus, not <i>Haiphong</i> , but	Haifong, Nafa.
g	is always hard. (Soft <i>g</i> is given by <i>j</i> ) -	Galápagos.
h	is always pronounced when used.	
hw	as in <i>what</i> ; better rendered by <i>hw</i> than <i>wh</i> , or <i>h</i> followed by a vowel. Thus, <i>Hwang ho</i> , not <i>Whang ho</i> , or <i>Hoang ho</i> .	Hwang ho, Ngan hwei.
j	English <i>j</i> . <i>Dj</i> should never be put for this sound.	Japan, Jinchuen.
k	English <i>k</i> . It should always be put for the hard <i>c</i> . Thus, not <i>Corea</i> , but	Korea.
kh	The Oriental guttural - - - -	Khan.
gh	is another guttural, as in the Turkish - -	Dagh, Ghazi.
l	As in English.	
m	As in English.	
n		
ng	has two separate sounds, the one hard as in the English word <i>finger</i> , the other as in <i>singer</i> . As these two sounds are rarely employed in the same locality, no attempt is made to distinguish between them.	
p	As in English.	
ph	As in <i>loophole</i> - - - - -	Mokpho, Chemulpho.
th	Stands both for its sound in <i>thing</i> , and as in <i>this</i> . The former is most common -	Bethlehem.

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Letters.	Pronunciation and Remarks.	Examples.
q	should never be employed; the sound of <i>qu</i> in <i>quiver</i> is given as <i>kw</i> . When <i>qu</i> has the sound of <i>k</i> , as in <i>quoit</i> , it should be given by <i>k</i> .	Kwangtung.
r	As in English.	
s	As in <i>sin</i> .	
sh	As in English.	
t		
v		
w		
x	- - - - -	Sawákin.
y		Kiküyu.
z	is always a consonant, as in <i>yard</i> , and therefore should never be used as a terminal, <i>i</i> or <i>e</i> being substituted. Thus, not <i>Mikindány</i> or <i>Wady</i> , but not <i>Kwaly</i> , but	Mikindáni, Wadi. Kwale.
zh	English <i>z</i> - - - - -	Zulu.
zh	French <i>j</i> , or as <i>s</i> in <i>treasure</i> - - - - - Accents should not generally be used, but where there is a very decided emphatic syllable or stress which affects the sound of the word, it should be marked by an acute accent.	Muzhdaha. Tongatábu, Galápagos, Paláwan, Saráwak.

In the case of native names in countries under the dominion of other European powers, in whose maps, charts, &c., the spelling is given according to the system adopted by that power, such orthography is, as a rule, disregarded, and the names are spelt according to the British system. Thus the island east of Java, in possession of the Dutch, is spelt Madoera by them, but on the Admiralty charts Madura. A town in Java appears on Dutch charts as Tjilatjap; in the British, Chilachap.

When a foreign language is written in a vocabulary of fixed sounds, so as to permit of transliteration into the British system, a table of equivalents for each letter is drawn up, and names of places can be transliterated without regard to pronunciation.

## INFORMATION RELATING TO CHARTS, SAILING DIRECTIONS, AND THE GENERAL NAVIGATION OF H.M. SHIPS.

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### ON THE CORRECTION OF CHARTS, LIGHT LISTS, AND SAILING DIRECTIONS.

THERE are three descriptions of publications as guides to navigation—the Charts, the Sailing Directions, and the Light Lists—which are all affected by the continual changes and alterations that take place.

Of these the charts should always be, so far as our knowledge permits, absolutely correct to date; and the Light Lists should be noted for the recent alterations, though space will not permit of full details being always inserted; the Sailing Directions, however, cannot, from their nature, be so corrected, and *in all cases where they differ from charts, the charts must be taken as the guide.*

**1. Charts.**—When issued to a ship on commissioning, the charts have received all necessary corrections to date. As sent from the Hydrographic Office they are, as a rule, fresh from the plates. They then receive such corrections by hand in the depôts as are required, and are so issued to the ships.

The charts in the folios should have the same dates of correction as shown against each in the Lists pasted on the outside of the folio. The Navigating Officer is to satisfy himself that they do so agree before signing the receipt for the same.

All small but important corrections that can be made by hand are notified by Notices to Mariners, and should at once be placed on the charts to which they refer.

Large corrections that cannot be conveniently thus made are put upon the plates, and fresh copies are issued to the ships to replace the others, which are directed to be destroyed to prevent the possibility of their being used in the navigation of the ship.

The dates on which these large corrections are made are noted on the chart plates in the middle of the lower edge; those of the smaller corrections at the left-hand lower corners.

In all cases of quotations of charts, these dates of corrections should be given, as well as the number of the chart (which will be found in the

lower right-hand corner), in order that at the Admiralty it may be known, what edition of the chart is referred to.

For convenience of office reference each chart has now two numbers the ordinary number in the right-hand lower corner, and a number in brackets, thus : [429] in the left-hand lower corner, which is now called the New Number.

These new numbers are also given in the Catalogue of Admiralty Charts.

**2.** *The Light Lists*, annually published at the beginning of each year, are not corrected in the depôts before issue, but appendices are issued every two months, giving the alterations that have taken place, copies of which are put into the chart boxes.

It is the duty of the navigating officer when he receives the set of charts to make notations in the Light Lists from these appendices, and from the Notices to Mariners in the box ; and to keep them so corrected from time to time.

The Light Lists should always be consulted as to the details of a light, as the description in the Sailing Directions may be obsolete, in consequence of changes made since publication. The charts also may not be equally up to date in some details, for which no Notices to Mariners have been issued.

**3.** *The Sailing Directions* are not corrected before issue, except occasionally for very important new rocks or dangers. Hydrographic Notices and Supplements referring to each volume are published from time to time.

Supplements contain all the information received up to date since the publication of the volume to which they refer, and cancel all previous Hydrographic Notices.

Hydrographic Notices contain all information up to date since the publication of the volume, or since the last Supplement or Hydrographic Notice, but endeavour is made to issue no more than one of these affecting each volume, and, on the collection of fresh information, to include the former Notice in a Supplement.

The existence of Supplements or Hydrographic Notices is to be noted, in the tabulated form placed for the purpose inside the cover of each volume, in cases when such notations have not been made before issue, and also on receipt of further Notices after commission.

Notes should be made in the margin of the volume of sailing directions affected, as references to the Supplements or Hydrographic Notices when the latter are printed on both sides.

To enable the books to be more conveniently corrected, however, such Supplements and Hydrographic Notices as are of moderate size are now being printed on one side only, and two copies are issued to each ship, one to cut up, the slips being pasted in at the appropriate place; the other to retain intact for reference.

To make these notations or paste in these slips is one of the early duties of a navigating officer after drawing his box of charts and books, and similar notes are to be made from Notices to Mariners that may thereafter be received.

It must, however, be thoroughly understood that sailing directions will never be correct in all details, except up to the date of the last Hydrographic Notice or Supplement, and that, as already stated, when differences exist, the chart, which should be corrected from the most recent information, should be taken as the guide; for which purpose, for ordinary navigation, they are sufficient.

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#### THE USE OF CHARTS AS NAVIGATIONAL AIDS, AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION.

**1. Accuracy of a Chart.**—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger is the scale of the chart.

To estimate this, the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fulness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

It appears to be insufficiently realized that the degree of reliance which may reasonably be placed upon an Admiralty chart, even in surveys of modern date, is mainly dependent on the scale on which the survey was made. The scale for publication is now generally that of the original survey, except in the case of Coast sheets, which are sometimes reduced. It should not, therefore, be assumed that the original survey was made on a larger scale than that published.

It must be borne in mind that the only method of ascertaining the inequality of the bottom of the sea is by the laborious process of sounding, and that in sounding over any area, the boat, or vessel, obtaining the soundings, is kept on given lines; that each time the lead descends it only ascertains the depth of water over an area equal to the diameter of the lead, that is about two inches, and that consequently each line of soundings, though miles in length, is only to be considered as representing a width of two inches.

Surveys are not made on equal scales, but each survey is made on a scale commensurate with its apparent importance. For instance, a general survey of a coast which vessels only pass in proceeding from one place to another is not usually made on a scale larger than one inch to the nautical mile, whilst surveys of areas where vessels are likely to anchor, are made on a scale of three inches to the mile, and surveys of frequented ports, or harbours likely to be used by Fleets, on a scale of from six inches to ten inches to the nautical mile.

Close examination by sounding is the only method by which surveys on a large scale can be made, and in view of the vast mileage of surveys yet requiring completion in the interests of navigation, it would be a waste of time to undertake large Coast surveys.

The scale on which a survey is to be conducted having been settled, it is manifestly superfluous to obtain more lines of soundings than can be represented on the paper. 100 soundings, which is the maximum number that can be placed with clearness on every square inch of paper, means that on a scale of one inch to the mile each sounding on the chart occupies an area representing eight acres of actual ground, whilst on a scale of six inches to the mile each sounding represents an area of a little less than a quarter of an acre, *i.e.*, of 100 feet square.

The following diagram represents as many soundings as can be placed legibly on a square inch of paper.

16	15	15	13	13	14	12	11	10	9
14	15	14	14	13	13	12	11	9	8
15	15	14	17	16	14	13	10	10	9
16	16	17	16	16	12	11	8	9	10
16	17	15	12	9	7	7	7	9	0
19	16	12	9	5	4	5	6	6	9
22	19	16	10	3	5	6	7	8	10
20	16	12	2	5	6	6	7	8	10
18	15	11	9	7	7	7	8	10	11
20	17	14	11	12	10	9	10	11	13

Little assistance in detecting excrescences on the bottom is afforded by the eye, even in clear water, on account of the observer being within five feet of the surface, none in turbid seas. If there is no inequality in the soundings to cause suspicion, a patch between two lines may occasionally escape detection.

Lines of soundings plotted as close as may be practicable on a scale of 6 inches to the mile would be 100 feet apart, and each line would be only 2 inches in actual width.

Thus, in a chart on a scale of 1 inch to the mile, an inequality of some acres in extent rising close to the surface, if it happened to be situated between two lines, might escape the lead; whilst in a chart on a scale of 6 inches, inequalities as large as battleships, if lying parallel to, and between the lines of soundings, might exist without detection if they rose abruptly from an otherwise even bottom.

General Coast charts should not, therefore, be looked upon as infallible, and a rocky shore should on no account be approached within the contour line of 10 fathoms, without taking every precaution to avoid a possible danger; and even with surveys of harbours on a scale of 6 inches to the mile, vessels should avoid, if possible, passing over charted inequalities in the ground, as some isolated rocks are so sharp that the lead will not rest on them.

Blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion. This is especially the case in coral regions and off rocky coasts, and it should be remembered that in waters where rocks abound it is always possible that a survey, however complete and detailed, may have failed to find every small patch.

A wide berth should therefore be given to every rocky shore or patch, and this rule should be invariably followed, viz., that instead of considering a coast to be clear unless it is shown to be foul, the contrary should be assumed.

**2. Fathom Lines a Caution.**—Except in plans of harbours that have been surveyed in detail, the five-fathom line on most Admiralty charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shores in such localities without taking special precautions.

The ten-fathom line is, on rocky shores, as before mentioned, another warning, especially for ships of heavy draught.

Charts where no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided, especially if ringed round, as there is no knowing how closely the spot may have been examined.

**3. Chart on largest scale always to be used.**—It sometimes happens that, from press of work, only the copper plate of the larger scale chart of a particular locality can at once receive any extensive re-arrangement of coastline or soundings. This is an additional reason, besides the obvious one of the greater detail shown why this largest scale chart should always be used for navigating.

**4. Caution in using Small Scale Charts.**—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile. This is particularly to be observed when coming to an anchor on a narrow ledge of convenient depth at some distance from the shore.

For the same reason bearings to objects near should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

**5. Distortion of Printed Charts.**—The paper on which charts are printed has to be damped. On drying distortion takes place from the inequalities in the paper, which greatly varies with different paper and the amount of the original damping; but it does not affect navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree, when carefully plotted upon the chart, especially if the lines to objects be long. The larger the chart the greater the amount of this distortion.

**6. Buoys.**—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact position. Buoys should therefore be regarded as warnings and not as infallible navigating marks, especially when in exposed positions; and a ship should always, when possible, be navigated by bearings or angles of fixed objects on shore and not by buoys.

**Gas Buoys.**—The lights shown by gas buoys cannot be implicitly relied on, as, if occulting, the apparatus may get out of order, or the light may be altogether extinguished.

**7. Lights.**—Circles drawn on charts round a light are not intended to give information as to the distance at which it can be seen, but solely indicate, in the case of lights which do not show equally in all directions, the bearings between which the variation, or visibility, or obscuration of the light occurs.

All the distances given in the Light Lists and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to height at the end of each Light List affords a means of ascertaining how much more or less the light is visible should the height of the bridge be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the standard compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its order, as given in the Light Lists, and in some cases by noting how much its visibility in clear weather falls short of the range due to the height at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles, if of any power. (See table in Light List before mentioned.)

The distance from a light cannot be estimated either by its brilliancy or its dimness.

**8. Fog Signals.**—Sound is conveyed in a very capricious way through the atmosphere. Apart from wind, large areas of silence have been found in different directions and at different distances from the fog signal station in some instances even when in close proximity to it. The apparatus, moreover, for sounding the signal often requires some time before it is in readiness to act. A fog often creeps imperceptibly towards the land, and is not observed by the people at a station until it is upon them; whereas a ship may have been for many hours in it, and approaching the land. In such a case no signal may be made. When sound has to travel against the wind, it may be thrown upwards; in such a case, a man aloft might hear it when it is inaudible on deck. Under certain conditions of the atmosphere, when a fog signal is a combination of high and low notes, one of the notes may be inaudible.

The mariner should not assume—

- a. That he is out of hearing distance, because he fails to hear the sound.
- b. That because he hears a fog signal faintly, that he is at a great distance from it.
- c. That he is near it, because he hears the sound plainly.
- d. That the distance from and the intensity of the sound on any one occasion, is a guide to him for any future occasion.
- e. That the fog signal has ceased sounding, because he does not hear it even when in close proximity.

Taken together, these facts should induce the utmost caution in closing the land in fogs. The lead is generally the only safe guide.

**9. Tides and Tidal Streams.**—In navigating coasts where the tidal range is considerable, caution is always necessary. It should be remembered that there are indraughts to all bays and bights, although the general run of the stream may be parallel to the shore.

The turn of the tidal stream off shore is seldom coincident with the time of high and low water on the shore. In open channels, the tidal stream ordinarily overruns the turn of the vertical movement of the tide by about three hours, forming what is usually known as tide and half-tide, the effect of which is that at high and low water by the shore the stream is running at its greatest velocity.

In crossing a bar or shallow flats, the table (B) at page 146 of the Tide Tables will be found of great assistance in calculating how much the water has risen or fallen at any hour of the tide.

On coasts where there is much diurnal inequality in the tides, the amount of rise and fall can never be depended upon, and additional caution is necessary.

It should also be remembered that at times the tide falls below the level of low-water ordinary springs. This always occurs on the coasts of Europe at the equinoxes, but in other parts of the world, and especially in the tropics, such periodic low tides may coincide more frequently with the solstices. Wind or a high barometer may produce it at any time, and the amount varies with locality. When the moon's perigee coincides with the full or new moon the same effect is often produced.

**10. Arrows** on charts only show the most usual or the mean direction of a tidal stream or current. It must never be assumed that the direction of a stream will not vary from that indicated by the arrow. In the same manner, the rate of a stream constantly varies with circumstances, and the rate given on the chart is merely the mean of those found during the survey, possibly from very few observations.

**11. Fixing Position.**—The most accurate method of fixing a position relative to the shore is by angles between well-defined objects on the chart. All ships are now being supplied with a station-pointer, and this method should be used whenever possible.

Two things are, however, necessary to its successful employment. First, that the objects be well chosen; and second, that the observer is skilful and rapid in his use of the sextant.

For the former, reference can be had to the pamphlet on the use of the station-pointer, which is in every chart box.

The latter is only to be obtained by practice.

It will readily be seen that in war time, when the compass may be knocked away, or rifle-fire may make it undesirable to expose the person more than necessary, a sextant offers great advantages, as angles can be obtained from any position whence the objects are visible. It is this contingency that makes it especially desirable that all navigating officers should become expert in this method of fixing a ship's position.

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

It is not intended that the use of the compass to fix the ship should be given up; there are many circumstances in which it may be usefully employed, but errors more readily creep into a position so fixed. In all cases where great accuracy of position is desired, angles should invariably be used, such as the fixing of a rock or shoal, or of additions to a chart, as fresh soundings or new buildings. In all such cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained not only prevent any errors, but they at once furnish a means of checking the accuracy of the chart itself. In the case of ordinary soundings, it is only necessary to take a third angle now and then; firstly, to check the general accuracy of the chart as above stated; secondly, to make certain that the more important soundings, as at the end of a line, are correctly placed.

Sometimes, when only two objects are visible, a compass bearing and sextant angle may be used with advantage.

In passing near a point of land, or an island, the method of fixing by doubling the angle on the bow is invaluable. The ordinary form of it, the so-called "four-point bearing," when the bearing is taken four points on the bow, and on the beam, the distance from the object at the latter position being the distance run between the times of taking the two

bearings, allowing for current, gives an excellent fix for a departure, but does not ensure safety, as the point, and probably the rocks off it, are abeam before the position is obtained.

By taking the bearings of two points and four points on the bow, a very good position is obtained before the object is passed ; the distance of the latter at the second position being, as before, equal to the distance run in the interval, allowing for current.

A table of factors, by which to multiply the distance run, to obtain the distance of the object when any number of degrees between the two bearings has been observed, is now supplied in all chart boxes.

The use of a danger angle in passing outlying rocks with land behind should also not be forgotten. In employing this method, however, caution is necessary, as should the chart be not accurate, i.e., should the objects selected be not quite correctly placed, the angle taken off from it may not serve the purpose. It should not, therefore, be employed when the survey is old or manifestly imperfect.

In fixing by the compass, it must always be remembered that two bearings only are liable to error. An absolute error may be made in either bearing observed ; errors may be made in applying the deviation ; or errors may creep in in laying them on to the chart. For these reasons, a third or check bearing of some other object should be taken, especially when near the shore or dangers. The coincidence of these three lines will prevent any mistakes.

Amongst astronomical methods of fixing a ship's position, attention is drawn to the great utility of Sumner's method. A Sumner line, that is, a line drawn through the position (obtained by an assumed latitude and longitude by chronometer) at right angles to the bearing of the sun as obtained from the azimuth tables, gives at times invaluable information, as the ship must be somewhere on that line provided the chronometer is correct. A deep cast of the lead at the same time may often serve to get an approximate position on the line. An early and very accurate position can be also obtained by Sumner's method, by getting a longitude by a bright star at daylight when the horizon is well visible, and another longitude by the sun when a few degrees above the horizon, or by observing two or more stars at twilight. The Sumner lines drawn through the two positions thus obtained will, if the bearing of sun and star differ three points or more, give an excellent result.

**12. Change of Variation of the Compass.**—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compasses placed on the charts for the purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long, the displacement of

position from neglect of this change may be of importance. The compasses are re-engraved when the error amounts to a quarter of a point, but the chart plates cannot be corrected more frequently from the impossibility of making alterations too often on one spot in a copper plate.

The geographical change in the variation is in some parts of the world sufficiently rapid to need consideration. For instance, in approaching Halifax from Newfoundland the variation changes  $10^{\circ}$  in less than 500 miles. The variation chart should be consulted on this head.

**13. Local Magnetic Disturbance of the Compass on board Ship.**—The term "local magnetic disturbance" has reference only to the effects on the compass of magnetic masses external to the ship in which it is placed. Observation shows that disturbance of the compass in a ship afloat is experienced only in a few places on the globe.

Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such rapid proportion as the distance from it increases that it would require a local centre of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

**14. Use of Oil for Modifying the Effect of Breaking Waves.**—Many experiences of late years have shown that the utility of oil for this purpose is undoubtedly, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skilfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows:—

1. On free waves, *i.e.*, waves in deep water, the effect is greatest.
2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain; as nothing can prevent the larger waves from breaking under such circumstances; but even here it is of some service.
3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when nothing else is

obtainable; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, both when running, or lying to, or in wearing.

6. No experiences are related of its use when hoisting a boat up in a sea-way at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions.

7. In cold water, the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. The best method of application in a ship at sea appears to be: hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from one to two gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the oil.

The position of these bags should vary with the circumstances. Running before the wind they should be hung on either bow—*e.g.*, from the cathead—and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying to, the weather bow and another position farther aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward, while the ship drifts.

9. Crossing a bar with a flood tide, oil poured overboard and allowed to float in ahead of the boat which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect cannot be so much trusted.

On a bar with the ebb tide it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the circumstances of the depth of water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary.

**x 32369.**

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IN THIS WORK THE BEARINGS ARE ALL MAGNETIC,  
EXCEPT WHERE MARKED AS TRUE.

THE VARIATION GIVEN IN THE MARGINS OF THE SEVERAL  
PAGES ARE FOR THE YEAR 1905.

THE LATITUDES AND LONGITUDES GIVEN IN THE  
MARGINS ARE APPROXIMATE.

THE BEARINGS OF THE LIMITS OF VISIBILITY OF ARCS  
OF LIGHTS ARE FROM SEAWARD OR TOWARDS THE  
LIGHT.

THE DISTANCES ARE EXPRESSED IN SEA MILES OR  
60 TO A DEGREE OF LATITUDE.

A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO  
100 FATHOMS.

THE SOUNDINGS ARE REDUCED TO LOW WATER OF  
ORDINARY SPRING TIDES.





THE  
CHINA SEA DIRECTORY.  
VOL. II.

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CHAPTER I.

GENERAL REMARKS ON THE VARIOUS COUNTRIES.—COALING PLACES. — DOCKS. — COMMUNICATION. — WINDS AND WEATHER.—CURRENTS.—PASSAGES.

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**GENERAL REMARKS.**—The China sea is the water Lat. 10° W.  
Long. 115° E. area between Singapore strait and the southern approach to Hong Kong, which is bounded on the west by the Malay peninsula, the coasts of Siam, Cambodia, Cochin China, Annam, and Tong King; and on the east, by the north-west coast of Borneo, and the westernmost of the Philippine islands. The description of the latter islands will be found also in the Sailing Directions for the Eastern Archipelago, Part I. In considering the Sailing Directions for the Philippine islands care is therefore necessary to consult the latest of the volumes published referring to them.

Towards the centre of the lower portion of the China sea there is a considerable area known to be occupied by numerous coral banks and reefs hitherto unsurveyed, and therefore dangerous, which should be avoided by all vessels. Mariners are advised to follow the tracts recommended and shown on the charts, as far as practicable.

**SIAM.**—The limits of the kingdom of Siam have varied much at Lat. 15° N.  
Long. 100° E. different periods of its history, most of the border lands being occupied by tribes more or less independent. The boundary between Burma and north-west Siam was delimited in 1891 by a Commission; and by the Treaty of September 1893, the river Mekong was constituted the boundary between Siam and the French possessions, but the Siamese were prohibited from keeping troops on a strip of territory 15 miles wide on the western bank.

Lat. 15° N.  
Long. 100° E.

In January 1896 an arrangement was agreed to between the British and French Governments, by which they guaranteed to Siam the integrity of the territory embraced in the basins of the Menam, Meklong, Pechaburi, and Bangpakong rivers, together with the coast from Muong Bang Tapan to Muong Passe, including also the territory lying to the north of the Menam basin, between the Anglo-Siamese border, the Mekong river, and the eastern watershed of the Me Ing.

On February 13th 1904 a new treaty was signed by the representatives of Siam and France (to be ratified within four months) by which the frontier between Siam and Cambodia will now be altered so that a territory of 8,000 square miles, including the provinces of Maluprey and Barsak, will be transferred to French rule, and, in addition, the Siamese Government abandons all claim to the Luang Phrabang territory on the western side of the Mekong.

The most important district of Siam is the wide valley of the Menam river, which has been termed the Nile of Siam, since it overflows its banks from June to November, and the success or failure of the great rice crop depends on the regularity and amount of this fertilising inundation. The Menam river is the great highway of the country, and around it are the most settled and advanced districts of Siam.

The area of Siam is about 220,000 square miles, of which about 60,000 are in the Malay peninsula, namely, the States of Kedah, Patani, Kelantan, and Tringano.

The extent of the population is imperfectly known, as the males only are numbered; the latest estimates give the population of the Kingdom as follows:—Siamese, 1,500,000; Chinese, 600,000; Malays, 600,000; immigrant Burmese, Indians, and Cambodians bringing the total up to 5,000,000.

The executive power is exercised by the King (Somdeth Phra Paraminda Maha Chulalonkorn), advised by a Cabinet consisting of the heads of the various departments of the Government. The Siamese dominions are divided into 41 provinces or districts, each having a Commissioner deriving authority direct from the King, and having under him subordinate governors over the various parts of his district. The Malay States retain a certain measure of independence. The prevailing religion is Buddhism, and education is mostly conducted by the Buddhist monks. The revenue is about 2,600,000*l.* per annum.

**Capital.**—Bangkok, the capital of Siam, is situated on both sides of the Menam Chau Fya or Bangkok river, about 25 miles from its mouth, and is accessible to vessels of about 18 feet draught.

It has a population estimated at 350,000, about 100,000 of whom are Chinese. At the mouth of the river are the Paknam forts.

There is a British Resident Minister and Consul-General at Bangkok, Lat. 15° N.  
a Consul at Bangkok and Chiengmai, and Vice-Consuls at Bangkok and Long. 100° E.  
Kedah.

**Products.**—The chief product of the country is rice, which forms the principal national food, and with teak is the staple article of export. Other produce is pepper, salt, dried fish, cattle and sesame, while (for local consumption only) hemp, tobacco, cotton, and coffee are grown. Fruits are abundant, including the durian, mangosteen, and mango.

Much of Upper Siam is dense forest; the cutting of teak is an important industry, almost entirely in British hands. Gold exists in some of the rivers, and gem mining is carried on in various districts.

The mining industry is under the control of the Royal Department of Mines and Geology, created in 1890. The Siam Mining Act of 1901 is now in force for most parts of the country, and prospecting licenses and mining leases may be obtained without difficulty. Mining is practically confined to tin, gems (sapphires and rubies), and gold, their relative importance being in the order given.

The total annual production of tin is about 5,000 tons, of a value of about 600,000*l.* There is an enormous field for the expansion of the tin mining industry in the Siamese possessions in the Malay peninsula.

Siamese sapphires form a considerable proportion of the world's supply of this gem. Siamese rubies do not command a high price, as those of good colour are mostly very small, whilst those of larger size are of poor colour. The gem-mining districts are, for the most part, exceedingly unhealthy; this fact being a great bar to European enterprise in this line.

Gold mining according to modern methods has been far from successful, owing partly to the difficult nature of the country for working by Europeans, and partly by bad management.

The other minerals mined for in Siam are copper, lead, iron, coal, oil, and saltpetre. They exist only in limited quantities, and are relatively unimportant.

**Trade.**—Nearly the whole of the trade is in the hands of foreigners; the foreign trade is centred in Bangkok. In 1904 the imports, consisting of textile fabrics, jewellery, hardware, opium, machinery, &c., were valued at 4,363,966*l.*, and the exports to 5,650,175*l.* In that year 738 vessels of 664,368 aggregate tons (140, of 126,736 tons, British) entered at Bangkok.

**Railways.**—Bangkok is connected with Paknam by railway, 16 miles; with Ratburi and Pechaburi, 95 miles; and with Korat, 165 miles. There is a branch line from Ban Phagi to Lopburi, 26 miles;

this line is being extended northwards to Chiengmai (population 50,000). A concession has been granted for a railway across the peninsula from Singora to Kota Satia, and thence to Kulim, about 136 miles.

**Telegraphs.**—There are about 2,900 miles of telegraph in the country, and Bangkok is in communication with Korat, Kong-Khai, Sesopone, Chentabun, Bangtaphan, and Chiengmai; with Moulmein and Tavoy, in Lower Burma; and with Saigon. Siam joined the International Postal Union in 1885, and the parcel post service in 1890.

Lat. 15° N.  
Long. 107° E.

**FRENCH INDO-CHINA.**—These possessions, which have an area of about 260,000 square miles, and a population of about 18,500,000, comprise Annam, Cambodia, Cochin-China, Tong King, and the Laos country. The dependency has been rapidly developed in recent years by public works, by the influx of capital and enterprise, and by the reorganisation of the finances. The administration is in the hands of a Governor-General, with a Lieutenant-Governor for Cochin-China, and Resident-Generals for the other divisions. In 1900 the territory of Kwang Chi Wan on the coast of China, leased from China in 1898, was placed under the authority of the Governor-General of Indo-China.

The Capital of Indo-China is Hanoi, in Tong King; see page 7.

**Rules for anchorage in French ports in Time of War.**—The French Government in a decree, dated 17th March, 1902, has made the following regulations as to the admission and sojourn in time of war of French and foreign vessels in the anchorages and ports of France, and of the French possessions:—

1. At night, between sunset and sunrise, it is absolutely forbidden for any vessel to approach the French coasts within a distance of three miles.

During daytime, between sunrise and sunset, vessels wishing to pass into the forbidden zone must exhibit the signal for a pilot, and must wait until permission is granted by signal or otherwise.

2. The failure to comply immediately with the said regulations will be enforced by blank cartridge, shot, or shell as the urgency of the case demands.
3. In time of war in the roadsteads and military ports of France, all circulation of boats other than those belonging to French ships-of-war is absolutely forbidden at night, and during daytime is only authorised to boats which have been granted special permission. Such boats even if they have received permission to move must keep clear of war-ships, and may not in any case approach them without permission from the said ships.

**Harbours and Rivers.**—The principal harbours are Haifong Lat. 13° N.  
Long. 107° E. on the Kua Kam in Tong King, Tourane and Thuan An (for Hué) in Annam, and Saigon in Cochin China. Vessels of 13 to 17 feet draught can reach Haifong. The Saigon river is navigable to the capital of the same name for vessels of deep draught, and small craft can reach Hué by the Hué river.

The Fai Tsi Long archipelago affords shelter for all classes of vessels during typhoons, and the mouths of the several rivers to vessels of light draught.

The chief routes of inland navigation are the Mekong, which, notwithstanding obstructions and rapids, has been navigated during the favourable season by very light draught steamers up to Luang Phrabang, about lat. 20° N., or more than 1,000 miles from its mouth, but it is not likely to develop into an important commercial route; and the Song Ka or Red river, which can be ascended by very light draught steamers as far as Laokai, near the Chinese frontier, a distance of some 250 miles.

Much has been done towards improving the canal and road communications in the deltas, and some small lines of railway have been built.

**Railways.**—The railways of Indo-China, constructed or authorised, had in 1902, a total length of about 1,010 miles, as follows:—(1) The line from Haifong to Hanoi (60 miles) was open, from Hanoi to Viétri (38 miles) nearly complete, from Viétry to Laokai (138 miles) in construction; (2) the line from Hanoi to Naindinh (72 miles) was complete, and was being continued to Ninhbinh, Songmai, and Vinh (130 miles); (3) that from Tourane to Hué (65 miles) was begun, and the route for its continuation to Kwang-tri (43 miles) was being surveyed; (4) the line from Saigon to Khan-hwa and Lang-bian (404 miles) was not far advanced; (5) that from Saigon to My tho (58 miles) had long been in operation. The Indo-Chinese railways all belong to government. In 1898 the Chinese government granted to France the right to construct a railway from Laokai to Yunnan (230 miles).

**Telegraph.**—Within the union there are 734 miles of telegraph line, with urban and inter-urban telephone systems.

**Trade.**—The French possessions in Indo-China are united into a Customs-Union. In 1902 the imports amounted to the value of 215,161,998 francs, and exports to 185,266,589 francs. In the same year 954 vessels of 1,119,548 aggregate tons entered the ports of Indo-China.

**Climate.**—The climate of French Indo-China resembles that of China in its oppressive summer heat but the winter is not so cold. See page 7, and weather tables, pages 562 and 563.

**ANNAM.**—French intervention in the affairs of Annam, which began as early as 1787, was terminated by a treaty, signed in 1884, and

ratified at Hué in 1886, by which a French protectorate has been established over Annam. Prince Buu Lam was proclaimed King on 31st January 1889, under the title of Thanh Thaï. The ports of Tourane, Kin hon, and Xuan dai were opened to European commerce, and the customs revenue ceded to France. French troops occupy part of the citadel of Hué, the capital. Annamite functionaries under the control of the French Government administer the internal affairs of Annam.

The area of the protectorate is about 52,100 square miles, with a population in 1901 of 6,124,000, of whom 4,000 were Chinese, and 250 Europeans.

Lat. 16° 29' N.  
Long. 107° 33' E.

**The Capital.**—Hué, the capital, has a population of about 50,000.

**Products.**—The productions are rice, maize, and other cereals, areca nut, mulberry, cinnamon, tobacco, sugar, manioc, bamboo, and timber; also caoutchouc and dye, and medicinal plants. Raw silk is produced and earthenware manufactured. There are iron, copper, and silver mines, and coal mines near Tourane.

**Trade.**—In 1896, the total imports amounted in value to 3,860,682 francs, and the exports to 2,398,610 francs. The total coasting trade amounted in value to 27,760,000 francs. The chief imports are cotton-yarn, cottons, tea, petroleum, paper goods and tobacco; chief exports, sugar and cinnamon. 260 vessels (including junks) of 105,178 tons entered in that year. See page 5.

**CAMBODIA.**—Area 37,400 square miles; population about 1,500,000, consisting of several indigenous races, 40,000 Malays, 250,000 Chinese and Annamites, and about 350 Europeans. The country is under King Norodom, who recognised the French protectorate in 1863, and it is divided into 57 provinces.

All the eastern portion of it is an alluvial plain through which the Mekong river runs, overflowing its banks during the five rainy months of the year; westward the country rises somewhat and is covered with dense forests. In the northern part, the Mekong is joined by the overflow of a lake some 100 miles in length.

**Capital.**—The two chief towns are Pnom-Penh (population about 50,000) the capital of the territory, and Kamput, neither accessible for sea-going vessels.

**Products.—Trade.**—The chief products are rice, betel, tobacco, indigo, pepper, maize, cinnamon, sugar-cane, and coffee. The external trade is carried on chiefly through Saigon in Cochin China. See page 7.

**COCHIN-CHINA.**—The area of French Cochin-China is estimated at 22,000 square miles. The whole is divided into four provinces,

Saigon, Mitho, Vinh Long, and Batak, and these into 21 arrondissements. Its affairs are directly administered by French officials. The total population in 1901 was estimated at 2,968,529, consisting chiefly of Annamites, but including Cambodians, Mois, Chams, Chinese, Malays, and Malabarians. The French population was 4,333, the French troops numbered 2,536.

**Capital.**—Saigon, the capital, had a population of 47,577 in 1901, Lat. 10° 46' N.  
of whom 5,475 were French; it is situated centrally on the river of the Long. 106° 42' E.  
same name, a branch of the Don nai or Fuok Bing Kiang, at about  
45 miles from the sea, and is connected with the Mekong delta by several  
navigable streams. Saigon is a modern town with numerous European  
buildings, including a citadel and dockyard. Cholon has about 130,000  
inhabitants.

**Climate.**—The climate of Lower Cochinchina is very unhealthy,  
owing to the excessive moisture combined with considerable heat. The  
country near the sea is composed chiefly of mangrove-covered swamps,  
this joins a reed-covered and marshy plain; farther inland it rises some-  
what and is covered with forests. The narrow maritime division of  
Upper Cochinchina has a pleasant climate, separated into the dry and  
wet seasons; *see* weather tables, pages 562 and 563.

**Products.—Trade.**—The chief product is rice, exported mostly  
to China, Java, and Europe; cotton, hides, fish, pepper, and copra are  
also articles of export. Imports consist chiefly of tissues, metals, imple-  
ments, wines, &c. In the year 1903 the total imports of Cochinchina  
and Cambodia, including coasting trade, were valued at 141,309,478 francs,  
and the exports at 122,085,554 francs. *See* page 6. At Saigon there  
cleared in 1904, 608 vessels of 871,286 tons (158 of 235,917 tons were  
British).

**Railway.—Telegraph.**—For railways, *see* Indo-China. There  
are about 2,670 miles of telegraph. Saigon is connected with Singapore,  
Haifong, &c., by submarine cable.

**TONG KING.**—This territory, annexed to France in 1884, has Lat. 21° N.  
an area of 46,400 square miles, and is divided into 14 provinces, with a Long. 105° E.  
population estimated at over 7,000,000 natives, 33,000 Chinese, and  
3,900 Europeans. The northern part is mountainous and inhabited by  
various hill tribes; the Song Ka fertilizes a large area of the centre, and  
the marshy coast-lands southward of its mouth produces great quantities  
of rice.

The chief town is Hanoi, an agglomeration of many villages, with a  
population of about 105,000. This town became on January 1st, 1892,  
the capital of Indo-China, instead of Saigon.

Lat. 21° N.  
Long. 105° E.

There is a native Regent who is the head of the native administration, but he does not rule; the direction of affairs is in the hands of the French Resident and his officials.

**Products.—Trade.**—The chief product is rice, exported mostly to Hong Kong; other products are sugar-cane, silk, cardamoms, coffee, cotton, various fruit trees, and tobacco. There are iron and copper mines of good quality. French companies work coal mines at Hongai, near Haifong, and at Kebao. The chief industries are silk, cotton, sugar, pepper, and oils. In 1899 the total imports amounted in value to 45,016,918 francs, the exports to 19,335,971 francs. The chief imports are metal and metal tools and machinery, yarn and tissues, beverages, &c.; chief exports, rice and animal products. The transit trade to and from Yunnan amounts to about 5,000,000 and 3,200,000 francs respectively. See page 5.

In 1894, there entered (exclusive of Chinese vessels) 197 vessels; of these 115 were French, 28 British, 25 Danish, and 20 German. In 1896, 1,407 vessels of 461,454 tons entered (probably includes junks). See page 5.

**Railway.—Telegraphs.**—For railways, see Indo-China. Hanoi is connected with Singapore by submarine cable, via Haifong and Saigon.

**The Laos territory,** under French Protectorate since 1893, is estimated to contain 98,000 square miles, with a population of about 605,000. The capital, Luang Phrabang, has about 40,000 inhabitants. The soil is fertile, producing rice, cotton, indigo, tobacco and fruits; there are teak forests, from which the logs are floated down the Mekong to Saigon. Gold, tin, lead, and precious stones are found. The country can only be entered by the Mekong, which is barred at Khone by rapids.

Lat. 23° N.  
Long. 114° E.

**CHINESE TERRITORY.**—Eastward of the French province of Tong King is the province of Kwang Tung, part of the empire of China. Pak hoi, a treaty port, is situated in its south-western portion. The Si kiang or West river, which discharges its waters at Macao island (Vol. 3), runs parallel to the coast at about 60 miles within Pak hoi. The port of Kwang chau wan, lies on the eastern side of Lei chau peninsula. Tihen Pak, Hui ling san, and Namo are the principal ports westward of Hong Kong, the eastern limit of this work.

The large island of Hainan, separated from the Lei chau peninsula by Hainan strait, is also Chinese territory; Hoi hau, the port of Kiung Chau, the capital, is a treaty port.

**Products.—Trade.**—The chief exports of Hainan are eggs, poultry, figs, sugar, cuttle-fish, honey, betel-nuts, grass-cloth, hemp, leather, &c., amounting in 1902 to the value of 284,115*l.* The imports are opium, cotton, beans and peas, flour, kerosene, rice, &c. and in the

same year were estimated at 439,944<sup>t</sup>. In that year 507 vessels of 371,261 aggregate tonnage, entered the port of Kiung Chau.

**BORNEO**, next to Australia the largest island in the world, is Lat. 0.  
about 690 miles in length, north and south, its greatest breadth being 600  
miles, and its average width about 350 miles. Chains of mountains  
traverse its length; the main range from 5,000 to 6,000 feet high terminates  
in Kini Balu, a mountain 13,700 feet in height, situated about 50 miles  
from the north extreme of the island. There are several other ranges of  
mountains.

Its vast interior consists of almost impenetrable virgin forests or jungle  
teeming with animal life, but sparsely populated by man. The soil is fertile,  
and in some parts near the coast is marshy.

The Dutch claim sovereignty over the greater portion of the south and  
west part of the island, along the coast of which they maintain establishments.  
The territories of the British North Borneo Company, the Sultan of Bruni,  
and of the Rajah of Saráwak, extend over and along the north-west,  
north, and north-eastern coasts. The native states are insignificant and in  
a backward condition.

The total population is estimated at about 2,000,000. The productions  
are many and varied, and its mineral resources are believed to be great.  
The Chinese, who have been settled in most Bornean towns for generations,  
conduct all the trading operations. The natives are of the Malayan type,  
and are, as a rule, indolent and wanting in enterprise.

A British Protectorate exists over Saráwak, Bruni, and the British  
North Borneo Company.

**SARÁWAK**.—The territory of Saráwak, on the north-west coast of Lat. 3° N.  
Borneo, comprises an area of about 50,000 square miles, with a population Long. 113° E.  
estimated at from 300,000 to 600,000, composed of various races. It is  
intersected by many rivers navigable for a considerable distance inland,  
and commands about 400 miles of coast line. The sovereignty of the  
district from Tanjong Datu (its western limit) to the entrance of Samaharan river, was obtained from the Sultan of Bruni in the year 1842,  
by Sir James Brooke, who became well known as Rajah Brooke of Saráwak.  
In 1861 a second cession was obtained from the Sultan of Bruni of all the  
rivers and land from Samaharan river to Kidorong point; in 1882 a third  
cession was obtained of 100 miles of coast line, and all the country and  
rivers between Kidorong point and Barram river, including about 3 miles  
of coast north-east of the latter to Lubok Pulai; and in 1885 another  
cession was obtained of the Trusan river, situated eastward of the mouth  
of Bruni river. In 1888 a British Protectorate was established, and in  
1890 the Rajah took possession of Limbang, which was approved by Her

Majesty's Government in 1891. The present Rajah is H.H. Sir Charles Johnson Brooke, G.C.M.G.

**Produce.**—The country produces diamonds, gold, silver, antimony, quicksilver, coal, gutta-percha, canes, rattans, beeswax, sago, pepper, &c.

**Trade.**—In the year 1903 the total imports were valued at \$8,172,993, and the exports at \$9,443,952.

Lat. 1° 34' N.  
Long. 110° 21' E.

The principal towns are Kuching, the capital of Sarawak, situated on the Sarawak river, about 20 miles from its mouth. Claude Town, the principal town on the Barram river, is about 60 miles inland. Bintula, at the mouth of the Bintula river, is noted for its sago. Muka, a few miles up the river of that name, is also noted for its sago and bilian (iron wood) timber. Oya, about 1½ miles up the Oya river, and Matu, about 5 miles up the Matu river, are both noted for their sago. Sibu is situated about 60 miles, Kanowit about 100 miles, and Kapit about 160 miles up the Rajang river. Kabong lies at the mouth of Kalaka river. Sarebas is about 80 miles up the river of the same name, which has a tidal wave or bore; Simang-gang, is about 60 miles up the Lumar, which also has a bore. Simunjan is about 18 miles up the Sadong river, where the government work a coal mine. Trusan is about 18 miles up the Trusan river, and Limbang about 10 miles up the Limbang river.

Harbour, buoy, and light dues, of 3 cents per ton, are chargeable to all vessels of 5 tons and upwards, payable on arrival.

**Harbours.**—The principal ports are Kuching and Bruni, the approaches to which afford secure anchorage for all classes of vessels.

**Communication.**—There are regular steamers running fortnightly from Kuching to Singapore and Labúan. Telegrams are sent by post from Singapore or Labúan.

Lat. 5° N.  
Long. 117° E.

**BRITISH NORTH BORNEO.**—This territory, formerly known as Sabah, situated at the north-eastern end of Borneo, has a coast line of about 900 miles. The chief geographical feature in the territory is Kini Balu mountain, 13,700 feet in height; the country is densely timbered. The territory of British North Borneo was acquired from the Sultans of Bruni and Sulu by cession for a small annual payment in 1879-80, and the British North Borneo Company was incorporated by Royal Charter in 1881. The area of the territory is 34,000 square miles; the population amounts to about 200,000, consisting mainly of Mohammedan settlers on the coast, and aboriginal tribes inland, with some Chinese traders and artisans. In May 1888, a British Protectorate was established.

**Harbours.**—The best harbours are those of Gaya on the west coast, Kudat on the north coast, and Sandakan on the east coast; the rivers are small.

**Produce.—Trade.**—The principal products are tobacco, timber, Lat. 5° N.  
Long. 117° E. rattans, gutta-percha, india-rubber, seed-pearls, bird's nests, trepang, beeswax, and other natural products. Tobacco planting promises to become a great industry; coffee is being taken up, and Manila hemp and sugar are receiving attention. The exports in 1902 amounted in value to \$3,671,004, and the imports to \$3,807,622.

**Climate.**—The climate of North Borneo is noticeable for nothing more than for its equability, and the absence of extremes. The temperature, rainfall, winds, and diseases are, for a tropical country, of the most mild and temperate types, and compare not unfavourably with the Straits Settlements. The chief diseases are fever, beri-beri, and dysentery; fever forms about one-fourth of the cases treated in the hospital.

**Railways.**—A railway runs from Weston in Padas bay to Beaufort, and thence to Jesselton in Gaya bay, the whole length being 110 miles. From Beaufort a branch line runs inland to Fort Birch.

**Telegraphs.**—A telegraph line runs across the island from Menambok (opposite Labúan) to Sandakan, with a branch to Weston. Darvel bay is connected with this line, and a line is carried northward to Gaya bay (Jesselton), Ambong bay and Kudat harbour.

**Communication.**—Trading steamers run constantly between Hong Kong and Sandakan, and the latter is connected with Labúan by land telegraph, thence with Europe by submarine cables to Hong Kong and Singapore, &c.—See Eastern Archipelago, Part I. for Sandakan.

**Labúan island**, situated about 5 miles off the north-west coast of Borneo, was ceded to Great Britain by the Sultan of Bruni in 1846 and taken possession of in 1848. It has an area of about 30 square miles, possesses a good port, has extensive coal deposits, and by situation seemed likely to become a dépôt for the trade of the north-west of Borneo, but it has only partially fulfilled these expectations. The produce of Bruni finds a market in Labúan, but the volume of trade is small. There are four sago factories on the island, where the raw material is converted into flour, for export chiefly to Singapore.

The government is administered by the Governor of the Straits Settlements, who resides in Singapore.

The population is about 8,400 of whom about 25 are Europeans and 17 Eurasians, the remainder being chiefly Chinese and Malays. The Chinese who number over 1,000, are the principal traders.

**Trade and Communication.**—See pages 167 and 168.

**Standard time.**—The standard time kept in British North Borneo and at Labúan is that of the meridian of long.  $120^{\circ}$  E., or 8 hours fast on mean time at Greenwich.

Lat.  $13^{\circ}$  N.  
Long.  $122^{\circ}$  E.

**PHILIPPINE ISLANDS.**—The western islands of the Philippine group, the principal of which are Palawan, Mindoro, and Luzon, form the eastern boundary of the China sea, and are described in this volume; the whole group are dealt with in Eastern Archipelago, Part I.

The existence of the Philippines, a rich and beautiful group of islands, was first made known to Europeans by the Portuguese navigator Fernando de Magalhaens early in the sixteenth century. The islands were considered by the Philippine Commission to be 1,725 in number. They contain an area of about 115,000 square miles. The total population at the census of 1902 was 7,635,426, of whom 647,740 were classed as belonging to the wild tribes.

The islands were formally annexed to Spain in 1565; but were ceded to the United States of America by treaty dated 10th December 1898. The people of the islands consist principally of the aboriginal Abetas or Etas, of dark brown colour with woolly hair and regular features, living as independent tribes in the interior; and those of the Malay origin, known as Tagalas and Bisayans, occupying the maritime districts. There are about 25,000 Europeans in the islands, and about 100,000 Chinese, in whose hands are the principal industries. Most of the islands are clothed with forests of ebony, iron wood, cedar, and sappan wood. They are generally mountainous and have many volcanic cones; that of Albay in the southern part of Luzon is 8,274 feet in height, and constantly emits smoke and steam.

**Earthquakes** of the most severe description have been experienced, the earliest recorded took place in 1616; that of 1796 was sadly calamitous. In 1824 many churches in Manila were destroyed, together with the principal bridge, numbers of houses, and a chasm opened four miles in length. In 1826, 1832, 1852, 1863, 1869, and 1880 there were terrible shocks of earthquake, and in 1891, in the province of Pangasinan, earthquakes were continually repeated during a period lasting a month. The most recent was the destructive eruption of Mayon in 1897.

The **capital** of the Philippines and the seat of Government is Manila, on the west side of Luzon; its bay affords anchorage for all classes of vessels, but owing to its great size the shelter is not good, and typhoons at times cause great damage to the shipping. A capacious artificial harbour is well advanced in construction, and will eventually afford complete protection.

**Products.**—The chief products are sugar, hemp, tobacco, and coffee; the foreign trade is confined to the ports of Manila, Iloilo, Sebu, and Samboanga. For exports from Manila, see page 324.

**Trade.**—The chief imports are rice, flour, coal, wines, and petroleum, the value of which for the whole group amounted in 1902 to \$33,342,166 (U.S. currency); the exports were valued at \$28,671,904.

In the same year, vessels of 1,047,352 aggregate tons (net) entered the ports of Manila, Iloilo, and Sebu.

**Port regulations.**—Foreign men-of-war and other public vessels before visiting Súbic bay are required to procure permission through the Minister of their respective countries. No foreign vessel is allowed to enter the actual limits of a navy-yard in any port of the United States without first obtaining leave to do so.

**Climate.**—The climate of the Philippines varies little from that of other places in the same latitude. The range of the thermometer during the year is from a little over 60° to about 90° Fahrenheit. The year may be divided into three seasons: the first, cold and dry, commences in November; the second, warm but still dry, commences in March, the greatest heat being experienced from April to the end of May; and the third, which is exceedingly wet, continues from June to the middle of November. During the rainy seasons inundations are frequent, and travelling in the interior almost impossible. The principal parts of the group come within the range of typhoons, and terrific storms are of frequent occurrence; the local storms that come in the months of May and June, the period of greatest heat, are at times very severe. A typhoon which occurred on 20th October 1882 left thousands without shelter, and great loss of life and property resulted. *See also* page 324 and weather table, page 560.

The endemic complaints of the country are swamp fever, diarrhoea, beri-beri, and a few others; the mortality is low considering the number of inhabitants.

**Railways.—Telegraphs.**—There is railway communication between Manila and Dagupan, a distance of 123 miles; other lines are contemplated; the principal places in Luzon are connected by land telegraph, of which there are 720 miles in the islands. Manila is connected with Negros, Sebu, Leite, Mindanao, Sulu, and all the principal islands, by submarine cables.

**COAL.\***—Large supplies of coal are obtainable at Bangkok, Bruni, Courbet point, Haifong, Kavite, Labúan, Manila, Muara, Saigon, Tourane, and possibly at Hongai. Smaller supplies may be had at Pontianak, Port Sual, Port Wallut for Kebao, Olongapo, Sarawak, and Hoi hau bay in Hainán. For details *see* the body of the work.

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\* *See Admiralty Coal and Telegraph chart, 1,188 [3,746].*

**DOCKING ACCOMMODATION.**—The principal docks for British vessels in this part of the China station are at Singapore, Vol. 1, and Hong Kong, Vol. 3.

The places in which docks are situated included in this volume are Bangkok, Saigon and Manila, for details of which see the body of the work or the Dock book. A floating dock, 500 feet in length over all, with a lifting power of 16,000 tons, is building, for the use of the United States Navy in the Philippine islands.

**STANDARD TIME.**—The time kept in the Philippine islands is that of the meridian of 120° E., or 8 hours fast on mean time at Greenwich. At Manila the Observatory time ball is dropped at noon standard mean time.

**COMMUNICATION.—Mails.**—Over 50 lines of sea-going steamers touch at Singapore. The three great steamship companies trading to the East, the Peninsular and Oriental, the Messageries Maritimes, and the North German Lloyd, connect it with Europe on the one hand and with China and Japan on the other. A local steam vessel runs regularly between Sarawak and Singapore. Bruni is in communication by steam vessel once a month with Singapore; also by small steam craft frequently with Labuan. Steam vessels leave Labuan for North Borneo and Singapore about once a week; for Sulu about twice a month; and for Palawan about once every two months.

The Spanish Trans-Atlantic Company run monthly between Manila and Liverpool, *via* Spain, and are the only regular line carrying goods to England without transhipment. The British India Company's vessels call at Manila every three weeks on their way from Calcutta to Japan. Steam vessels run between Manila and Singapore and Saigon twice a month, or oftener, and between Manila and Hong Kong every few days. Local traffic in the Philippines is carried on by about 20 small steam vessels.

Communication is maintained between Bangkok and Singapore by steam vessel weekly. From Saigon there are weekly mail steam vessels to Europe, and constant communication between Hué, Haifong, &c. There are steam vessels from Hoi hau to Hong Kong and Pakhoi at intervals of three or four days, and occasionally to Haifong, Tourane, Singapore, and Bangkok. For more details, see the places referred to in the body of the work.

**Submarine telegraphs.**—The ports mentioned are connected with Singapore by submarine cable, and thence with the world, as follows:—Labuan is connected with Singapore and with Hong Kong. Manila with Hong Kong, and with Iloilo in Panay; cables also connect all the principal islands, as stated on page 13. In addition, Manila is connected by a trans-Pacific submarine cable with San Francisco, *via* Guam and Honolulu; also with the Caroline islands, *via* Guam. Saigon is connected with Singapore and with Hong Kong, and also with Hué and Haifong.

Bangkok is connected by land lines with British India, and with Saigon, Hué, Haifong, &c. Sandakan is in communication with Mempakol by land lines, and thence with Labúan.

**Chinese treaty ports.**—Pakhoi and Hoi hau (Kiung Chau) are treaty ports. Inland from Pakhoi, on the frontier of Tong King, is the treaty port of Szemao or Ssumao (lat. 22° 48' N., long. 100° 46' E., approximate). For the ports farther northward, see Vol. 3.

### UNIFORM SYSTEM OF BUOYS AND BEACONS.

**—Philippine islands.**—All buoys in the Philippine archipelago are painted in accordance with the system used in the United States, as follows:—

In approaching a channel from seaward, red buoys with even numbers will be found on the starboard side of the channel, and must be left on the starboard hand by vessels passing in.

In approaching a channel from seaward, black buoys with odd numbers will be found on the port side of the channel, and must be left on the port hand by vessels passing in.

Buoys painted red and black in horizontal stripes will be found on obstructions with channel ways on either side of them, and may be left on either hand.

Buoys painted white and black in perpendicular stripes will be found in mid-channel, and must be passed close-to to avoid danger.

**Beacons.**—Day beacons, stakes, and spindles (except such as are on the sides of the channel, which will be coloured like buoys) are constructed and distinguished with special reference to each locality, and particularly with regard to the background upon which they are established.

**Coast of China.**—The following system of colouring buoys, beacons, and distinguishing marks of wreck-marking vessels is adopted in Chinese waters.

The side of the channel is to be considered starboard, or port, with reference to the entrance to any port from seaward.

#### Buoys.—

1. Buoys coloured red mark the starboard side of the channel, and must be left on the starboard hand by vessels entering.
2. Buoys coloured black mark the port side of the channel, and must be left on the port hand by vessels entering.
3. Buoys painted in red and black horizontal bands mark the fairway, and should be passed close-to.
4. Buoys painted in red and black vertical stripes mark the ends of spits, and the outer and inner extremes of banks, shoals, or extensive reefs, where there is a navigable channel on either side of such bank, shoal, or reef. Vessels must not attempt to pass between a buoy thus painted and the danger it marks.

5. Buoys painted red and black chequered mark rocks in the open sea, and also obstructions of small extent having channels on either side of them. When marking the latter, they are placed seaward of the danger. Vessels must not attempt to pass between a buoy thus painted and the danger it marks.
6. When two chequered buoys—red and white, and black and white—mark an obstruction, the red and white buoy marks the starboard side of the channel, and must be left on the starboard hand by vessels entering; and the black and white buoy marks the port side of the channel, and must be left on the port hand by vessels entering.
7. Wrecks are in all cases marked by green buoys, with the word wreck and a number over it painted on them in white letters; when a wreck lies in the open sea, or in a position where there is a navigable channel on either side of it, the buoy carries no other distinguishing mark, and is in every such case, placed seaward of the wreck.

Wreck buoys marked with an even number must be left on the starboard hand, and those with an odd number on the port hand, by vessels entering.

All other marks on buoys are in addition to the foregoing.

**Wreck-marking vessels** carry by day a red flag or such other mark as may be locally notified, and at night exhibit either one red light or a red light vertically over a white light.

**Beacons** marking channels and dangers are painted in a similar manner to buoys used for the same purpose.

The rules for painting beacons apply in each case to the body of the structure. When a beacon painted a single colour, either black or red, is surmounted by a distinguishing mark, such mark may be painted the same colour as the body of the beacon, or with that colour and white combined, or white alone.

When the body of a beacon is painted in two colours, the same colours only are used for the mark surmounting it.

Beacons on land, to enable bearings to be taken, or to give lines of direction for crossing bars or entering rivers, harbours, &c., are painted so as to make them as conspicuous as possible. Red, black, and white are the only colours used.

**Light-vessels.**—The light-vessels in Chinese waters exhibit a white light from the forestay to indicate the direction in which the vessel is riding.

Light-buoys must not be implicitly trusted, *see page xviii.*

**Chinese vessels.—Lights.**—The “Regulations for preventing Collisions at Sea” are accepted for general use in Chinese waters by all

Chinese vessels of foreign type, but Chinese junks, fishing vessels, &c., do not carry the regulation lights.

Steam pilot vessels in Chinese waters, when engaged on pilotage duty, carry, in addition to the lights required for pilot vessels by the regulations for preventing collisions at sea, a red light, visible all round the horizon from a distance of at least two miles, at 8 feet below the white mast head light, and when under way also the usual side lights.

**JUNKS.—Caution.**—Enormous fleets of fishing junks may be met on the coast of China; these vessels carry no lights, as a rule they have the smallest sail forward and are stoutly built; serious damage would probably be caused to an iron vessel in collision with one of them. The large trading junks have five masts with two small sails aft.

**WATER.—Caution.**—On the coast of China no water for drinking or cooking purposes should be procured from the shore, if it can possibly be avoided. If water cannot be obtained by condensation, great care must be taken in selecting the watering place on shore, which it is essential should be above cultivated areas; the water should be boiled before use.

Dysentery and probably cholera, which is particularly prevalent at the end of summer and in autumn, result from drinking impure water. The peculiar way the Chinese manure the fields; the overcrowding in their towns; and a general disregard of ordinary sanitary precautions, cause the pollution of the water.

Aërated waters sold by the natives, and ice stored by them, must not be used.

**Diseases.**—In China, besides dysentery and cholera, milder forms of intestinal diseases are common in summer, and occur probably from the promiscuous use of raw vegetables, or from chills caught when lying on deck at night.

There is a peculiar form of intestinal catarrh, popularly known as sprue, which attacks Europeans predisposed to illness; the mucous membrane is affected, diarrhoea is often profuse, and only fresh milk diet, and often hospital treatment, or removal from the country, can cure the patient.

#### WINDS AND WEATHER.\*

**General remarks.**—Over the whole of the China sea, the south-west and north-east monsoons prevail, but in the northern part during both monsoons easterly and south-easterly winds are frequently

\* See Admiralty Wind and Current Atlas for the Pacific, &c.

experienced. Land and sea breezes occur near the coasts; they are experienced more frequently during the south-west than in the north-east monsoon, and prevail most on the coasts of Cochin China, Palawan, and Luzon. The north-east monsoon is much the stronger, and the more permanent of the two, being but rarely interrupted, whilst the south-west is particularly irregular, and often very weak.

The winds may be summed up briefly as follows:—From November to March the north-east monsoon blows. In April calms precede the change of the monsoon, with variable winds between N.E. and S.E.

In May the south-west monsoon is established on the Asiatic coast, with N.E. to S.E. winds in the middle of the sea, and easterly winds in the northern part.

In June, the south-west monsoon is fairly established. In September the monsoon becomes weak; strong winds from South to N.W. occur, often blowing with violence, and accompanied by rain on the coasts of Borneo and Palawan.

In October the north-east monsoon is established, and blowing fresh in the northern part, except on the coast of Luzon, where it is feeble, with calms and showers from south-west, south of the parallel of 13° N.

In November and December the north-east monsoon is strong, but calms, variable winds and rain occur, in the eastern portion.

**The north-east monsoon** occasionally sets in as early as the last week in August, but it usually begins in the northern part of the China sea about the end of September or early in October. In the southern part it seldom blows steadily till November; there light southerly or variable breezes prevail for the greater part of October. This monsoon generally (and sometimes without warning) commences with a gale, which frequently lasts ten or twelve days and blows with great violence; therefore when the monsoon is about to change do not anchor in unsheltered positions, and weigh immediately the wind freshens, as otherwise, owing to the swell rising quickly, there is a difficulty in getting the anchor. Although the weather in some years is settled and fine, during September and October, the period of the autumnal equinox is a very precarious one, and storms frequently occur in those months.

In November the north-east monsoon prevails generally, but it blows more steadily, and with greater strength, in December and January; the weather then is frequently cloudy, with much rain and a turbulent sea, particularly southward of Fulo Sapatu in lat. 10° N.

In February there are generally strong winds and unsettled weather. During March the wind is moderate, with steady weather all over the China sea, inclining to land and sea breezes on the coast of Luzon.

**The south-west monsoon** generally commences in the China sea, about the middle or end of April, and continues to the beginning or middle of October, liable to an acceleration or retardation of about a fortnight. It sets in sooner about the gulfs of Siam and Tong King along the western shore than in the open sea or near the coasts of China, Palawan, and Luzon. It also continues longer to the southward of the parallel of 11° N. than in the northern part of the sea, where it generally terminates about the first week in September; for whilst north-east and easterly winds are blowing on the China coast, southerly winds frequently prevail between Singapore and Pulo Sapatu until the middle of October, although more often, about Pulo Sapatu, light northerly and variable winds and calms prevail at this period.

- In May the winds in the open sea are often light and variable, and easterly or south-east winds are likely to occur for a day or two at a time during the whole of the south-west monsoon, particularly in the northern part of the China sea, where these winds are frequently experienced in both monsoons.

The south-west monsoon is at its greatest strength in June, July, and August, at which period there is at times much rain and cloudy weather all over the China sea; in these months, and also in May, sudden hard squalls sometimes blow out of the gulf of Siam, as far as Pulo Condore and Pulo Sapatu. When dense clouds are perceived to rise, indicating the approach of these squalls, sail ought to be reduced without delay.

During the strength of the monsoon, the wind draws southward, varying between S.S.W. and S.S.E., in the months of June and July.

From the gulf of Siam to cape Padaran, the south-west monsoon blows nearly parallel to the coast; and if close in, a light wind from the land is at times experienced at night, succeeded by a short interval of calm on the following morning. The monsoon breeze then sets in, and generally continues brisk during the day. These land and sea breezes prevail most on the coast of Cochin China, from cape Padaran northward to Tong King gulf; for on this coast during this monsoon, the sea wind dies away almost every evening, and a land breeze comes off in the night, although not at a regular hour. This is followed by calms or light airs, which frequently continue until noon; the sea breeze then sets in from the south-east.

In September the monsoon falls light and variable.

**Coast of Palawan.**—The monsoons on this coast are so subject to interruption, being influenced by local circumstances and other causes, that it is difficult to say at what period either fairly sets in.

Lat. 9° N.  
Long. 118° E.

In January, when the north-east monsoon is blowing steadily in the China sea, moderate north-east and easterly winds prevail on the coast of

Palawan, and land and sea breezes have been experienced with considerable regularity.

In April, north-east and easterly winds usually blow steadily on the coast of Palawan, freshening considerably after daylight, and dying away towards sunset.

May, and the early part of June, appear to be the finest period of the year on the coast of Palawan, when land and sea breezes prevail with tolerable regularity, the former coming from the south and south-east in the morning, and the latter from the north and north-west in the afternoon.

Towards the end of June, and throughout July, unsettled weather may be expected. A slight depression of the mercury, after a succession of fine weather, frequently indicates the approach of strong squalls from the W.S.W., which are usually accompanied by dark cloudy weather and much rain, lasting for a week or ten days. These are generally succeeded by a period of fine weather, with north-west and south-west winds, which draw to the southward and eastward in the morning. If June or July have been unsettled, it may be expected that August generally will be fine, with moderate south-west, but more frequently westerly winds, particularly in the afternoon.

In September and October the wind generally blows strong from the W.S.W., with dark cloudy weather; and off the south-west end of Palawan, squalls, which veer to W.N.W. and N.W., sometimes blowing with violence succeed each other rapidly, and are accompanied by rain. Between the squalls the wind frequently shifts to south-east.

In November and December the weather is variable; north-east and easterly winds, changing at times to south-east, more frequently prevail; but it is not unusual, especially in the former month, to have a south-westerly blow, with dark cloudy weather and rain.

Lat. 15° N.  
Long. 120° E.

**South-west coast of Luzon.**—The winds on this coast are subject to some extent to the winds blowing in the China sea, namely the north-east monsoon from mid-October to mid-May, and the south-west monsoon from June to October. It may, however, be said that the north-east winds prevail on this coast, and they are generally fresh, especially in November, December and January, more particularly in the northern part. From February to May they have a tendency to haul eastward in abating. Gales from this quarter frequently set in which last from one to three days; they are nearly always indicated by bright weather with clouds to the north and a rise of the barometer. They also occur in rainy weather but with less force.

The north-east monsoon is regarded as the fine season, and the weather generally dry and clear. The wind usually hauls to N.N.E. and North during the day, becoming calm in the evening; later the land breeze

comes off. There are also sometimes intervals of calm, or westerly breezes blowing from about 10 a.m. until sunset.

The months of March and April are the finest on this coast; during May the winds are weak and variable; storms gather on the mountains and cause violent squalls from S.E. to S.W., occurring almost daily in Manila bay and the gulf of Lingayen.

The south-west monsoon is only well characterised from July to October, which is the period of the gales, termed "Collas," which blow from S.W. to West and are accompanied by violent squalls and much rain. They often continue for several days. North-west gales and breezes from that direction are not frequent, but when the north-west wind sets in with a little rain and the land appears at intervals, a typhoon must be apprehended. The season of these storms is from September to November; the barometer often remains high and therefore does not always indicate their approach.

**Gulf of Siam.**—The north-east monsoon in the gulf of Siam sets in at the end of October or early in November. It is usually preceded by a month of squally, variable, and uncertain weather, and fogs are prevalent, especially near Pulo Panjang. At the end of November the monsoon is fairly established, bringing with it heavy squalls and gloomy weather on the western shore, whilst on the eastern shore the sky is often unclouded for a week together with winds from the eastward. In the middle of the gulf the wind is north-east.

Lat. 12° N.  
Long. 101° E.

In November and December, strong squalls, with heavy thunder and lightning, are occasionally met with near Pulo Panjang.

In December and January the monsoon blows with its greatest strength.

Towards the end of January the wind blows more from the eastward, is steadier, and abates in strength.

In February the wind is more constant from E.S.E. than from any other point; it blows between S.E. and N.E. with occasional calms and squalls. Fine weather and smooth water now prevail all over the gulf.

In March the monsoon cannot be depended on. In the middle of the gulf calms prevail with southerly winds near the shore, and occasional land and sea breezes. Towards the end of the month the weather becomes hot and sultry.

April is the hottest month of the year; calms may be expected near the middle of the gulf; land and sea breezes near the shore, and occasional slight squalls. From mid-April to mid-May, southerly winds predominate with calms, light rain, and heavy squalls at times. The south-west monsoon is established about the middle or end of June, preceded by a few weeks of unsettled weather.

In June, July, and August the south-west monsoon blows strongest, with occasional showers, but generally there is very fine weather along the western shore of the gulf, where also the wind is more southerly ; out in the middle there is a rough sea ; and along the eastern shore there are strong breezes with much rain, and occasionally a fresh gale.

In September the wind is unsteady, veering between S.W. and W.N.W. in strong gusts. Heavy and continuous rain may be expected in this month.

In October the wind shifts between West and North, and abates considerably in strength ; the rain squalls are less frequent. Towards the end of the month the wind settles in the north, and the cold weather and fine season sets in.

The south-west monsoon is scarcely felt close in shore, between cape Patani and the Redang islands, its course being interrupted by the high land in that neighbourhood. To the southward of Pulo Kapas it takes the direction of the coast, shifting a few points on or off shore by day or night, under the influence, alternately, of the sea and land breezes.

Squalls are frequent in the south-west monsoon ; they rise to the westward, accompanied by a heavy bank of clouds generally in the form of an arch, blow with considerable strength for a short time, and are frequently accompanied by heavy rain : strong gales are unknown in the gulf.

Lat.  $10^{\circ}$  N.  
Long.  $107^{\circ}$  E.

**Lower Cochinchina.**—The north-east monsoon sets in towards the end of October, and continues until March, when there are variable easterly winds, and calms up till May ; then the first light airs of the south-west monsoon are felt.

In June, July, and August, heavy rains accompany the south-west winds ; land and sea breezes prevail when the monsoon is weak.

**Annam.**—Upon this coast the north-east monsoon period is accompanied by rain and northerly winds from December to April. As far south as cape Padaran the monsoon is generally strong, but southward of the cape it blows with less force and calms are more frequent.

During the south-west monsoon, land and sea breezes are fairly regular ; the former is followed by calms or light winds, which generally last up to noon when the sea breezes set in.

The winds may be said to be variable and weak during the whole year. There are heavy rains during the months of September, October, and November. See Weather table (Saigon), page 562.

**Tong King gulf.**—During the month of October northerly winds are established in the gulf.

From the beginning of November to the end of April the winds are as Lat. 19° N.  
follows :— Long. 107° E.

South of the 17th parallel, the wind varies between East and E.N.E.; between the 17th and 18th parallels the winds are variable from the eastward, with breezes sometimes from North to N.W., varied by calms; between the 18th and 19th parallels, the winds are from E.N.E. to E.S.E. near Hainan, and from N.E. to N.N.E. near the coast of Tong King; north of the 19th parallel the winds are from North to East.

The winds are moderate, only attaining on two or three occasions, and for a short duration, a force of 6.

From May to August, near the coast, winds from S.S.E. to S.S.W. prevail, with variable winds from West and sometimes from the opposite direction.

Towards the centre of the gulf, the winds are from S.S.W., S.W., and even W.S.W.; between Hainan and the coast variable winds and calms prevail.

These winds are weaker than those of the north-east monsoon period, rarely exceeding a force of 4.

The weather is generally fine and dry, from the end of October to the beginning of January and the temperature falls to 54° Fahr., with a considerable range during the 24 hours.

From the month of January fogs become prevalent, especially in February and March, the sun scarcely shows itself in these three months, and the temperature is down to 48° or 50° in the morning.

In April, at the end of the north-east monsoon, the weather begins to brighten, and keeps fine until June, when storms and rains make their appearance; the temperature rises to 83°.

In June, with the south-west monsoon, ushered in by storms, the rainy season establishes itself, and lasts up to September, but the month of August is characterised by torrential rains which succeed each other almost without interruption; the temperature is often 95°. From September to November the winds are weak and variable except for the somewhat frequent occurrence of typhoons, and the weather is almost always fine; temperature declines perceptibly. The sea in Tong King gulf, although disturbed at times, does not run high.

The Fai Tsi Long archipelago affords good shelter during typhoons for all classes of vessels. See Weather table, page 563.

**TYPHOONS.**—The cyclonic storms of the China seas between China and Japan have long been named typhoons, after a Chinese word, meaning great wind.

The wind in these storms is precisely similar to that in all revolving storms in the northern hemisphere; it revolves round the central area of low pressure in the direction contrary to the motion of the hands of a watch, curving also spirally towards the centre; and at the same time the whole storm-field advances, sometimes with great velocity and sometimes at scarcely more than the rate of a few miles an hour.

The average rate of progress of the centre of a typhoon in lat.  $11^{\circ}$  N. is 5 miles an hour; in lat.  $13^{\circ}$  N.,  $6\frac{1}{2}$  miles; in lat.  $15^{\circ}$  N., 8 miles; in lat.  $20^{\circ}$  N., 9 miles; in lat.  $25^{\circ}$  N., 11 miles; in lat.  $30^{\circ}$  N., 14 miles. Southward of lat.  $13^{\circ}$  N., the rate does not vary perceptibly, but it is more variable the further to the northward, and in lat.  $32\frac{1}{2}^{\circ}$  N. it ranges from 6 to 36 miles.

The area over which these storms extend varies from 20 to some hundreds of miles in diameter, and near land the strong winds are so irregularly distributed, that in a place near the centre there may be less wind than at some distance further away from it.

Typhoons are experienced in the Western Pacific and northern part of the China sea, between the parallels of  $9^{\circ}$  N. and  $45^{\circ}$  N., and are most prevalent in the months of July, August, September, and October; from December to May they seldom happen, still they have been known to occur in every month of the year. Between May and November these storms commonly follow each other quickly, and there are often several raging at one time; then they cease, and there are none perhaps for several weeks; in August and September a total cessation is most unusual, and the equinox is a very precarious period.

Typhoons are most frequent in the vicinity of Luzon, Hainan, and south-westward of Japan. They are said to blow with the greatest fury when near the land, and their violence is not so great when they pass well to the southward of the coast of China.

The following table, giving the number of typhoons that occurred at Hong Kong during the years 1886-1899, will show the probability of a typhoon being encountered in this portion of these seas, in any particular month:—

Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1	0	1	4	10	24	45	48	57	31	22	6	244

In the Philippine Archipelago the typhoons which appeared, either crossing it or passing through it for a greater or less distance, were 468 in number between the years 1880-1901, inclusive, viz.:—

Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
9	2	5	10	25	41	74	74	88	65	51	24	463

Not one of the 441 typhoons which were registered from 1880 to 1900, inclusive, occurred in the month of February; and only 5 in the month of March during the complete period. Their frequency then increases from April, when 10 were observed, to July, when 74 occurred. The maximum of 88 is reached in September, thus giving a yearly average of 4 for this month. From October the number gradually diminishes up to January, for which month but 9 are recorded.\*

As a rule, typhoons commence from east to south-east of the Philippines, whence they advance in courses between West and N.N.W. In May their paths are confined to the tropics. In June they trend towards Hainan island, over Hong Kong and Swatau, or up the Formosa channel. In July, August and September they become general.

September is especially dangerous, both for the reasons already mentioned, and owing to great irregularity of path caused by the north-east monsoon, which commences in the higher latitudes in fitful puffs. In October they are confined to the tropics by the north-east monsoon; but a few having their origin well eastward of the Philippines, will make for the south-east coast of Japan. In November they blow only between the parallels 9° to 14° north in the China sea; but, as in October, a few run north-eastward between Liu Kin and the Benin island. In the central and northern parts of the China sea their course lies between N.W. by W. and W. by S. those having much northing generally continuing overland and recurring into the gulf of Pechili. The typhoons travelling between W. by N. and W. by S. usually break up inshore. Those that cross the north end of Luzon in the south-west monsoon, either come through the Bashi channel and make their way up the China coast, or else run up the east coast of Formosa, and then hug the North China shore; both these paths are dangerous.

During the latter months of the year, typhoons that enter the China sea after crossing the Philippines in a low latitude occasionally recurve to the south-westward; others after crossing the Philippines recurve in the China sea and re-enter the Pacific, passing between Luzon and Formosa;

\* See "The Cyclones of the Far East" by Rev. José Algué, S.J., Director of the Philippine Weather Bureau, Manila Observatory, 1904.

these latter occur at the beginning and end of the typhoon season, but chiefly in May.

In the typhoons of the summer months, which move towards the W.N.W. or N.W. in the north part of the China sea and reach the coast in the neighbourhood of the gulf of Tong King, the area over which the winds become strong, with a decided fall in the barometer in front of the centre, is generally small. This is accounted for by the low pressure prevailing over the gulf of Tong King and the continent beyond it. For the same reason the winds in rear are not only stronger but long continued.

In the autumn months (September and October) these conditions are reversed, and in front of the storm the barometer begins to fall and strong winds blow at great distances from the centre, whilst in rear the area over which the winds are governed by the depression is comparatively small.

In consequence, a vessel in front of a typhoon moving as stated above, will usually get much shorter notice of the advance of a typhoon from the barometer in summer than in autumn, and while in summer the bad weather lasts for a long time in rear, in autumn it improves rapidly when the centre is past and a strong N.E. monsoon sets in.

The winds round a typhoon centre may be said to be composed of cyclonic winds on the one hand and the prevailing wind on the other.

**Warnings of approach.**—In the China sea the earliest signs of a typhoon are clouds of the cirrus type looking like fine hair, feathers or small white tufts of wool travelling from east or north, a slight rise in the barometer, clear and dry hot weather and light winds.

These signs are followed by the usual ugly and threatening appearance of the weather which forebodes most storms, and the increasing number and severity of the gusts with the rising of the wind. In some cases one of the earliest signs is a long heavy swell and confused sea, which comes from the direction in which the storm is approaching, and travels more rapidly than at the storm's centre.

The best and surest of all warnings, however, will be found in the barometer. In every case there is great barometric disturbance. Accordingly if the barometer falls rapidly, or even if the regularity of its diurnal variation be interrupted, danger may be apprehended.

No positive rule can be given as to the amount of depression to be expected, but at the centre of some of the storms the barometer is often two inches lower than outside the storm-field.

**Practical rules.**—In the typhoon season be constantly on the watch for the premonitory signs, and carefully observe and record the changes of the barometer and wind.

When there is reason to believe that a typhoon is approaching, the two points necessary for the seaman to know, are (*a*) the direction in which the centre of the storm is situated; and (*b*) in which semicircle of the storm the vessel is situated.

In order to ascertain these two points it is necessary that the observer should be stationary; the first thing therefore to be done is to stop head to wind, or heave to, and as it is always wise to assume the vessel may be in the dangerous semicircle, she should be hove-to on the starboard tack (in the northern hemisphere). There should be no hesitation in heaving-to, as the sooner a clear knowledge of the position of the ship in the storm is ascertained the better it will be.

To find the bearing of the centre the observer should face the wind, when the centre will be from 12 to 8 points on the right hand in the northern hemisphere, and on the left hand in the southern hemisphere. At the commencement of the storm allow 12 points, when the barometer has fallen three-tenths of an inch about 10 points, and when it has fallen six-tenths of an inch or upwards, 8 points.

To ascertain in which semicircle the ship is in, watch carefully the way the wind shifts. If the wind shifts to the right the vessel is in the right-hand semicircle, and if to the left in the left-hand semicircle. This holds good in both hemispheres.

*If the ship is in the right-hand semicircle* she should if in the northern hemisphere remain hove-to on the starboard tack, but if in the southern hemisphere run with the wind on the port quarter until the barometer begins to rise.

*If the ship is in the left-hand semicircle* she should if in the northern hemisphere run with the wind on the starboard quarter, but if in the southern hemisphere remain hove-to on the port tack.

*If in the direct track of the storm* the wind will, without change of direction, increase rapidly in force, whilst the barometer continues to fall, and then the most advisable course to pursue is to run with the wind on the starboard quarter in the northern hemisphere, and on the port quarter in the southern hemisphere until the barometer has ceased to fall.

In all cases act so as to increase as soon as possible the distance from the centre; bearing in mind that the whole storm-field is advancing.

In receding from the centre of a typhoon, the barometer will rise and the wind and sea subside.—See the Barometer Manual for full details.

**GALES** sometimes blow steadily from E.N.E. or N.E. several days at a time, in September or October, near the south-east coast of China. In the same months they are liable to happen on the west coast of Luzon. Here they mostly commence at North or N.W., and veer to West, S.W.,

or South, blowing strongly from all these directions, with heavy rain, and a cross turbulent sea ; but they seldom continue long.

In May, June, July, and August, severe gales are at times experienced in the north-western part of the China sea, particularly between lat. 14° N. and Hainan island, the approach to Tong King gulf. These gales generally begin at N.N.W. or N.W., and blow with violence out of the gulf, accompanied by dark weather and a deluge of rain ; from N.W. they shift to West and S.W., still blowing strong, and abate as they shift more southerly. When these N.W. gales are blowing in the vicinity of Hainan and the coast of Cochin China, strong S.W. or southerly gales generally prevail at the same time, in the middle of the China sea.

On May 3rd, 1904, at 3h. 30m. p.m., a hurricane passed over Saigon, doing considerable damage to property, in which ships broke adrift and native craft suffered greatly. Such an occurrence at Saigon is rare.

With respect to the gales of the Philippines, Captain Villavicencio, who studied the subject during many years, remarks :—

"The gales of the Philippines may be separated into three classes, known by the local names of *Colla*, *Nortada*, and *Baguio*. The *colla* is a gale in which the wind blows constantly from one quarter, but with varying force, and alternations of violent squalls, calms, and heavy rain, usually lasting at least three days ; these gales occur during the south-west monsoon, and their direction is from the south-west quarter.

"The *nortada* is distinguished from the *colla* in that the direction of the wind being constant also, the force of it remains steady as well, without the alternations of passing squalls with calms at intervals which characterise the *colla*. The *nortada* is nearly always indicative of a typhoon passing not very far off. These gales occur chiefly in the northern islands, and their direction, as the name implies, is from the northward.

"*Baguio* is the local name for the cyclonic storm known as *typhoon* in the China sea, and has already been described."

**Squalls** are common during both monsoons, the most dangerous are those known as the Arch squalls. When clouds are seen rising from the horizon in the shape of an arch, sail should at once be shortened, as a heavy gust of wind may be expected ; these squalls when the arch is near the zenith are accompanied by heavy rain.

**Climate and Rainfall.**—The general remarks on climate will be found with the remarks on the several countries, in the first few pages of the work ; for special ports, and for the rainfall, it will be found with the description of those ports, where known. The north-east monsoon period is the healthy season. Rainfall at certain places will be found in the Meteorological Tables at the end of the work.

**STORM SIGNALS.**—See page 325.

## CURRENTS AND TIDES.

The principal currents in the China sea are the north-east and south-west monsoon drifts. They are both very changeable, their direction and velocity depending much upon local circumstances, but that during the north-east monsoon is the stronger and the more constant.

**North-east monsoon period.**—The current in the China sea during the north-east monsoon, generally runs to the south-westward, with a velocity depending on the strength of the wind. When the force of the monsoon is abated, or during moderate and light breezes, there is often little or no current.

The current on the western side of the great mass of reefs included between Prince Consort bank and Ladd reef is usually slack, even during the strength of the monsoon, and at other times is setting to windward; from Ladd reef to North Danger reef there is invariably a current setting to the north-east. When H.M.S. surveying vessel *Riflemen* was at anchor on the reefs, during both monsoons careful observations were taken of the set of the current, which, for 16 hours out of the twenty-four, invariably set to windward, generally with the greatest force when the monsoon was strongest. *See also* page 109.

In the western parts of the sea, along the coasts of Cochin China and the Malay peninsula, the current generally begins to run to the southward about the middle of October (sometimes sooner on the former coast), and continues until April. During the month of March its direction is generally to the south or south-eastward about Pulo Aor, with light easterly winds and calm at times. On the coast of Annam, and adjacent to Hainan island, a current varying from South to S.W. commences sometimes about the middle of September; near the land, from lat. 15° N., to about 11½° N., it increases in strength, but its rate decreases in proportion as it flows southward. During the prevalence of the north-east monsoon, from about lat. 14° N. to cape Padaran, the current near the coast frequently runs 40 or 50 miles, and sometimes as much as 80 miles to the southward in 24 hours; the rate, however, is variable, and it is only in the limits above mentioned that it is occasionally so strong, for its strength abates at cape Padaran, and it then runs with less velocity to the S.W. towards the gulf of Siam.

On the southern coast of China the current during the north-east monsoon runs almost constantly W.S.W., nearly parallel to the land; and sometimes with considerable rapidity, when a typhoon or a storm occurs. The current at the distance of 70 or 80 miles from the coast seldom runs so strong as near it; and in depths of 30 or 40 fathoms there is much less current than in shallow water near the shore and amongst the islands.

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*See Admiralty Current charts for the Indian and Pacific Oceans, &c.*

The westerly current sometimes slacks, and contiguous to the land the tidal streams prevail, when not overcome by the force of the current, especially at springs.

Between Formosa and the China coast the current runs to the southward during the north-east monsoon. When strong north-east winds prevail its direction is generally from S.W. to South, between the south end of Formosa and the north end of Luzon; but in light variable winds it often sets to the northward. On the west coast of Luzon the current is changeable, sometimes setting southward along the coast, at other times northward, but always with a decided tendency towards the coast. On the coast of Palawan it is also governed by the prevailing winds, but seldom runs strong in any direction, unless impelled by gales.

**South-west monsoon period.**—Late in April, or early in May the current generally begins to set to the northward, in the southern and middle parts of the China sea, and while the south-west monsoon is strong, continues to run in a north-easterly direction until September; but it is not constant in this monsoon, for at times, when the wind is moderate or light, it is liable to change and set in various directions. After the strength of the monsoon has abated, there is often little or no current in the open sea, running to the north-eastward; and sometimes its direction is to the southward.

Along the coast of Cochin China, from Pulo Obi to cape Padaran, the current sets generally E.N.E., parallel to the shore, from April to the middle of October; and during the same period its direction is generally to the northward along the east coast of the Malay peninsula, from the entrance of Singapore strait to the gulf of Siam. To the northward of cape Padaran there is but little current during the south-west monsoon, near the Cochin China coast; thence to Tong King gulf, a small drain is sometimes found setting northward, at other times southward. When a gale blows out of the latter gulf from the north-west and westward, the current sets generally to the south-west or southward, in the vicinity of the Paracel islands and reefs or where these gales are experienced; and this current running obliquely, or contrary to the wind, produces a turbulent and high sea.

On the southern coast of China the current is much governed by the wind; when strong south-west winds prevail, it runs along shore to the eastward, but is seldom strong. Near, and among the islands, westward of Macao, there is generally a westerly current, occasioned by the freshets from Canton river, setting in that direction; and which frequently sweeps along the islands from Macao to St. John, between W.S.W. and W.N.W., about one or two knots per hour. This westerly current is, however, not

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*See Admiralty Current charts for the Indian and Pacific Oceans, &c.*

always constant during the south-west monsoon, for a weak stream may sometimes be experienced running to the eastward.

On the coasts of Luzon and Palawan, the current generally sets to the northward and towards the land in the south-west monsoon, but frequently there is no current, and near these coasts it seldom runs with much strength. Occasionally a slight south-westerly set will be experienced in the Palawan passage during this monsoon. Near the Bashi islands it sometimes sets eastward when strong westerly winds prevail; but generally strongly to the northward, or between N.N.W. and N.E.

**In the Gulf of Siam.**—The currents in the gulf, near the middle are generally weak and variable, but near the land, in the strength of the monsoons, strong sets may be expected. In the south-west monsoon a strong northerly current was found, from Lem Chong P'ra to Samroiyot point. In the north-east monsoon there is frequently a strong set to the westward across the head of the gulf.

In the neighbourhood of the Redang islands and Pulo Obi, the currents prevalent in the China sea may be expected. The China sea current does not appear to enter the gulf farther than a few miles, but to set across its mouth in both monsoons.

The flood stream of tide from the China sea appears to strike the western shore of the gulf and divide somewhere near cape Patani; for at the Redang islands the flood sets to the southward, and at Singora and Koh Krah it was found setting to the northward.

**Tides.—China sea.**—The observations on tides in the China sea are neither numerous enough nor complete enough to permit of accurate generalizations being made for the whole area. The following remarks, however, based on the existing evidence, afford some idea of the general tidal movement.

They are affected by a diurnal inequality, especially of height, causing a difference between the heights of successive high and low waters, which varies throughout the lunation, and sometimes attains large proportions.

The difference may be almost imperceptible, or may be so great that the movement of the water between the lower high water and higher low water is reduced to a mere stand in the level of the water, giving the effect of only one high and low water during the 24 hours.

The time of high water is generally the most regular feature of the tides, and follows the time of the moon's transit as usual.

Spring tides depend upon the opposition and conjunction of the moon and sun (full or new moon), and also on the attainment by the moon of her higher declination north or south.

The effect of these two positions of the moon is about equal on the tide, so that when the moon is either new or full, at the same time that she is in the high north or south declination, the spring tide is high and well defined. When the new or full moon occurs when she is on the equator, the spring tide is sometimes almost lost.

This is equivalent to saying that the higher and best defined spring tides occur about the solstices (June and December), and the lower and least defined about the equinoxes (March and September).

The higher water of each day follows either the superior or inferior transit of the moon when she is on one side of the equator, and the opposite transit when she is on the other side of the equator. The particular transit followed by the tide varies in different localities.

On the north-west coast of Borneo ; among the Philippine islands ; and in the Tong King gulf, when the sun has north declination, the higher tides about springs occur during the day, and when it has south declination, during the night.

The mean tide level on the different coasts varies during the year ; on the coast of Luzon it is lowest in February and highest in August ; in the Tong King gulf it is highest during the north-east monsoon, or from November to March ; and also about Kin bon, on the coast of Cochin China, it is lower in May and June than in March.

## DIRECTIONS FOR MAKING PASSAGES.\*

### OUTWARD (NORTHWARD) ROUTES.—FULL-POWERED STEAM VESSELS.

**General remarks.**—Towards the centre of the lower portion of the China sea, there is a considerable area of unsurveyed and dangerous ground, known to be encumbered with coral reefs and banks, which should be avoided. Vessels are recommended to follow the routes shown on the charts of the China sea, as far as practicable.

Charts, 2,660a, b  
[2,678, 2,679],  
2,681a, b [2,680,  
2,681].

### SINGAPORE TO HONG KONG.—Both monsoons.

—Mail and other full-powered steam vessels take the Main route ; that is, between Pulo Aor and the Anamba islands, eastward of Pulo Sapatu, and thence between Macclesfield bank and the Paracel group to Hong Kong.

An alternate route, taken by many of the mail steamers in the north-east monsoon, and recommended for vessels of somewhat smaller power, is, after passing westward of the Anamba islands, to steer about 30 miles westward of the Prince of Wales bank and North Danger reef, thence about the same distance eastward of Macclesfield bank ; from abreast the latter the fore and aft sails will usually stand. The current is decidedly

\* See charts, 1,077 [3,511] and 1,078 [3,512] ; also "Ocean Passages."

favourable in this track, from about lat. 10° N., except possibly when the monsoon is unusually strong.

Charts, 2,680a, b  
[2,678, 2,679],  
2,681a, b [2,680,  
2,681].

**Singapore to Gulf of Siam and to Saigon.** — Both monsoons.—Mail and similar full-powered steam vessels take the direct route.

**Singapore to Manila.** — Main route until northward of the central dangers in the China sea, thence direct.

#### VESSELS WITH SAIL AND AUXILIARY STEAM-POWER.

**SINGAPORE TO HONG KONG.** — South-west monsoon.—Vessels with sail and auxiliary steam power, in this the fair wind monsoon, also take the Main route, passing between Macclesfield bank and the Paracel group.

During the strength of the monsoon, the Inner route along the coast of Cochin China may be adopted, with the advantage of obtaining smooth water. Proceeding by the Inner or Cochin China route, steer from Pulo Aor along the coast to the Redang islands, thence across the gulf of Siam, and along the coasts of Cambodia and Cochin China, keeping the latter aboard to cape Tourane; thence steer for the south-west part of Hainan, coasting along the east side of this island and passing between it and the Taya islands; then steer to make the coast of China about Tienpak, or Huiling san island. The islands thence to Hong Kong may be coasted along at discretion, and shelter may be found amongst them on emergency.

**North-east monsoon.—Palawan route.** — Vessels with too little power to follow the alternative route taken by full-powered vessels in the north-east monsoon, are recommended to take the Palawan passage. On leaving Singapore, pass southward of Victory and Barren islands, then steer to sight the small island of St. Pierre (carefully observing and allowing for the set of the current), and afterwards steer for the Api passage, keeping towards Marundum island rather than Tanjong Api. Having passed Marundum and Tanjong Datu, the course is clear up to the entrance of the Palawan passage, passing between the south Luconia shoals and Barram point, and keeping as close as circumstances may make convenient to the Borneo coast, until abreast of that point. Thence a course should be shaped to keep seaward of the 100-fathoms edge of the bank fronting Palawan, to Balabac island; thence midway between the Royal Captain shoal and the edge of the bank; this portion, about 28 miles in width, is the narrowest and most dangerous part of the channel.

If the wind be well to the southward, and the weather thick, Balabac island may be approached sufficiently near, in order to obtain a good

*See charts, 1,077 [3,511] and 1,078 [3,512]; also "Ocean Passages."*

Charts, 2,660a, b [2,678, 2,679]. observation of the land, but caution is necessary not to go within 12 miles of it, as soundings of 26 and 20 fathoms extend that distance off, in a westerly direction from the peak, having shoal patches immediately inside them.

If the wind be to the westward, with thick cloudy weather, Balábac island should not be approached nearer than 30 miles, as westerly winds usually force a strong easterly current through the passages. Off the south-west end of Paláwan, it is not unusual, particularly in squalls, for the wind to veer to W.N.W., and sometimes N.W., blowing with violence, and placing the vessel on a lee shore with respect to the shoals inside the edge of the bank. This weather generally prevails off the south-west end of Paláwan, about September and October, rendering it uncertain and difficult to make the narrowest part of the channel, owing to the land being obscured, especially if the position of the vessel has not been checked by observations. Under these circumstances, it is advisable to proceed with caution, regulating the speed of the vessel so as to pass the Royal Captain shoal during daylight.

If uncertain of the vessel's position, endeavour to get soundings on the edge of the bank north-westward of Balábac island, the safest part to approach for this purpose being about the elbow, on the parallel of  $8^{\circ} 30' N.$ , or immediately to the southward of it; for it is believed that the edge of the portion of the bank with Balábac peak bearing from S.E. by E.  $\frac{1}{2}$  E. to S.S.E., comprising a distance of 25 miles, is free from danger. If the peak be obscured, the same bearings of the body of the island will answer.

During the period the *Royalist* was engaged upon this survey (1845-48), experience led to the belief that in the thickest weather the land is seldom totally obscured for any length of time, but generally shows a well-defined outline between the squalls.

Having obtained soundings (which will be about 90 fathoms, if close to the edge of the bank, and from 45 to 55 fathoms, sand, if inside), haul off to the north-westward, to give the edge a berth of about 10 miles, then steer a mid-channel course.

Having passed the Bombay shoal, steer a course parallel with the edge of the bank, preserving a distance of 8 to 12 miles from it, and 27 to 30 miles from the land, or nearer, if convenient, and the peaks on Paláwan are sufficiently distinct to get good cross bearings. It is, however, not desirable to get too close, as the edge of the bank in about the parallels of  $9^{\circ} 30'$  and  $10^{\circ} N.$ , is not uniform in its outline, and several rocky patches lie within a mile, and in some places only 3 cables from the edge.

The course is slightly more northerly when abreast Ulugan bay, where the bank extends 28 miles from the shore.

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*See charts, 1,077 [3,511] and 1,078 [3,512]; also "Ocean Passages."*

Proceeding northward from the Palawan passage, it is customary to steer along the west coast of Luzon to cape Balinhasai, lat.  $16^{\circ} 26' N.$ , and thence direct to Hong Kong, passing to leeward of the Pratas.

**Singapore to Labúan. Both Monsoons.**—Vessels should take the Palawan route, page 33.

**Singapore to Manila. South-west monsoon.**—The Main route, as for Hong Kong, until northward of the central dangers in the China sea, thence direct.

**North-east monsoon.**—The Palawan route, page 33.

**SINGAPORE TO GULF OF SIAM AND SAIGON.—South-west monsoon.**—Vessels with sail and auxiliary steam power, if bound to the gulf of Siam, having cleared Singapore strait should shape a course to make the Redang islands, and then steer along the western shores of the gulf.

If bound to Saigon, pass westward of Pulo Condore, and thence to Saigon.'

**North-east monsoon.**—Vessels with sail and auxiliary steam power generally steer a direct course during this monsoon to the gulf of Siam and to Saigon ; but during the strength of the monsoon, in December and January, it would seem advantageous to follow the route recommended for sailing vessels, viz., east of the Anamba islands if bound to the gulf of Siam, and east of the Natuna islands if bound to Saigon.

#### SAILING VESSELS.

**SINGAPORE TO TANJONG API.—South-west monsoon.**—As far northward as the Rumenia shoals north entrance of Singapore strait, the tidal streams are tolerably regular, but some miles off shore a current will be found setting about N.N.W. in the south-west monsoon ; its greatest strength will be experienced between Pulo Tioman and the Anamba islands.

In order to obviate the effect of this set or current, it is considered prudent to make good the course for Saddle island from Singapore strait, by which, should light airs prevail, the option will be afforded of steering either between Victory and Barren islands, or south of Barren island ; thus avoiding the Acosta rock. This caution may appear unnecessary, the distance between Barren and Camel islands being 33 miles ; but a little consideration will satisfy the navigator that, upon the course shaped to counteract the current, running strong in the vicinity of these islands (to the north-eastward as near as could be determined by the lines of scum viewed from the summit of Barren island), he would not, even with a fair wind, pass more than 10 miles to windward of Victory and Barren

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See charts, 1,077 [3,511] and 1,078 [3,512] ; also "Ocean Passages."

Charts, 2,660a, b [2,678, 2,679], 2,681a, b [2,680, 2,681]. islands. On leaving Barren island a course, allowing for a northerly set, should be shaped to pass well to the southward of the St. Pierre islands and rock.

The depths near St. Pierre rock, and in the direct course for Tanjong Api, range between 20 and 15 fathoms, and approaching this headland the first cast under 15 fathoms at night should be deemed the warning. By day, as the land is neared the vessel's position may readily be determined.

**North-east monsoon.**—See the Palawan route, page 37.

**SINGAPORE TO HONG KONG.—South-west monsoon.**—Sailing vessels proceeding from Singapore to China, should, as June approaches, use the Main route, eastward of Pulo Sapatu, and between the Macclesfield bank and the Paracel group, the winds being more steady in the open sea than near the coast. As early as April a westerly breeze will sometimes be found blowing out of the gulf of Siam, and continuing to the Macclesfield bank, from whence easterly winds will be experienced to Hong Kong.

This route becomes precarious if a sailing vessel has not arrived in the vicinity of Pulo Sapatu early in October; for near this island, about the middle of that month, strong southerly currents begin to prevail with light northerly winds, variable airs, and calms, by which many vessels have been delayed for several days, and have made no progress to the northward. Fresh winds from the southward have been met with, even so late as 1st November, but these instances are rare.

Some vessels proceeding by the Main route have carried strong south-west and southerly winds, when others taking the Inner route have at the same time experienced north-west and westerly gales blowing out of Tong King gulf, with dark weather and rain, and have been in danger of being driven among the Paracel reefs; the Inner route ought, however, to be chosen in the strength of the south-west monsoon, for the sea will be smooth, and being near the land anchorage may be obtained if required. The gales out of the gulf are not frequent, and the land may be kept in sight nearly all the time.

Proceeding by the Inner route, follow the directions given for vessels with auxiliary steam taking this route, page 33. If it be taken before the end of March, the passage may be tedious unless in a fast sailing vessel.

The Palawan passage may be used late in the south-west monsoon, when vessels should steer north of Victory island, and between Great Natuna and Subi islands; thence proceeding as directed for sailing vessels taking this route in the north-east monsoon.

Bound to Hong Kong in the strength of the south-west monsoon, endeavour to make the Great Ladrone island bearing about North, then

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See charts, 1,077 [3,511] and 1,078 [3,512]; also "Ocean Passages."

steer between it and Gap rock of the Kaipong islands; thence between Lingting and the Lema islands, and through Lema channel into West Lamma channel. After the middle of August, when easterly winds are likely to prevail several days together, as they are more or less at all seasons, it will be necessary to make the north-east head of the Lema islands, and proceed in by Lema channel towards West Lamma channel. East Lamma channel is also safe in both monsoons, for although the water is deep, if the wind fall light, anchorage can be obtained, and there is little or no tide.

**SINGAPORE TO HONG KONG.—North-east monsoon.**—Sailing vessels leaving Singapore for China during the north-east monsoon, may expect a tedious passage if the Main route be adopted; see page 39. Near the change of the monsoon, the Inner route, page 33, along the coast of Cochin China is generally the most expeditious, as the south-west monsoon sets in earlier there than in the open sea.

**Palawan route.**—The passage to China by the coasts of Palawan and Luzon is the recommended route during the strength of the north-east monsoon.

To proceed by this route:—In December, January, and February, sailing vessels should not leave the entrance of Singapore strait, in strong north-east winds, but anchor on the northern shore, under the Water islands, in 9 or 10 fathoms. In those months gales often occur, with thick weather, the rain lasting two or three days, and the south-south-eastward current outside, attains a rate of  $2\frac{1}{2}$  or 3 knots an hour. A vessel leaving the strait then, instead of fetching St. Barbe island, would fall bodily to leeward and have to work up the west coast of Borneo. Fine weather follows, with the wind backing round to North and N.W.; and the current in the offing decreases in strength to about  $1\frac{1}{4}$  knots.

Leave the Water islands with the first of the ebb and keep clean full. Steer to the north-eastward to go through the channel between Subi island and the Great Natuna; a passage that may without much difficulty be made in these months, especially at full and change, when, it is stated, the wind after a few hours' calm, frequently shifts to the westward with squalls and rain, and then hauls round to S.W. and South blowing moderately for 24 hours.

By taking advantage of these changes, Subi may be easily weathered, and the more or less unsurveyed channels between it and the north-west coast of Borneo avoided. After arriving in the vicinity of Low island, southward of Great Natuna, if the wind continue easterly, steer to the northward on the starboard tack, passing westward of Low island, and keeping not less than 3 miles from its south-western side to avoid the shoal water extending 2 miles from it. Pass about 5 miles westward of

*See charts. 1,077 [3,511] and 1,078 [3,512]; also "Ocean Passages."*

Charts, 2,660a, b  
[2,678, 2,679].

Haycock, as the coral reefs about that island extend fully 3 miles from its south-west side, and there is a patch beyond that distance. Vessels should not pass between Haycock and Low island unless with the sun in a favourable position, as this locality has several hidden dangers.

After passing Haycock there will be no difficulty in working towards the south point of Great Natuna, as that island, when approached from the south-west, shelters against the strong south-west current of the monsoon. Off its southern shore at night, in fine weather, the wind is off the land, but the south and south-east shore should not be approached nearer than 6 or 7 miles, on account of the off-lying dangers.

Sailing vessels fetching to leeward of Subi with a northerly wind should take Koti passage, between Pulo Panjang and Sirhassen island. The Sirhassen passage is also safe when the south side of Sirhassen island is kept aboard. The current among these islands is more regular than in the Api passage, where it sets in various directions, and with considerable velocity to the S.W. from 16 to 19 hours at a time; for large vessels any of the other passages are preferable to this, as great caution and perseverance are requisite in working through. When using it the Borneo coast, in 10 to 11 fathoms water, must be kept aboard to avoid the current and to profit by the land winds.

In taking the Koti passage, give Pulo Panjang a good berth to avoid the reef which surrounds it. The winds amongst these islands and as far eastward as the meridian of cape Sirik are generally from North to N.N.W. The passage cleared, proceed to the north-eastward; endeavouring, if not certain of the longitude, to make the Royal Charlotte, or Louisa reef, whichever is the weathermost, by running on its parallel of latitude; and as the currents appear to be influenced by the prevailing winds, a set in the direction in which it is blowing should be anticipated, the velocity of the current being proportionate to the force of the wind.

Having made either the Royal Charlotte or Louisa reefs, or passing in mid-channel between them, steer to the eastward for about 100 miles, thence north-eastward along the edge of the 100-fathoms line, as recommended for vessels with sail and auxiliary steam using the Palawan passage.

When working through the Palawan passage, having conformed to the directions given for making the south-west end of Palawan, page 34, sailing vessels should, in fine weather, endeavour to make their inshore boards in the afternoon, for the sun then being astern of the vessel, the patches lying near the edge of the bank will generally be distinguished from the mast-head in ample time to tack. In squally weather, also during heavy rains, these patches have been observed imparting a very distinct yellowish hue to the surface of the water.

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*See charts, 1,077 [3,511] and 1,079 [3,512]; also "Ocean Passages."*

It is almost needless to remind the seaman (when the land is obscured) of the desirableness of getting soundings on the edge of the bank before dark, in order that he may have a good departure for the night; and on making his inshore board it must also be borne in mind, that the probability of coming suddenly into soundings is great, as the approach will generally be at right angles to the edge of the bank. He should therefore be prepared to tack immediately on getting the first indication of soundings.

Proceeding northward from the Palawan passage, it is customary to work up the west coast of Luzon to cape Balinhasai, and thence direct for Hong Kong, passing leeward of the Pratas. But if bound to any of the ports northward, much time may be saved by working up through the Balintang channel, thence along the eastern coast of Formosa, thereby avoiding the labour, wear, and loss of time by the attempt to work against the monsoon along the coast of China, which even a clipper sometimes fails in effecting.

In working along the Luzon coast, particularly about dawn and sunset, less sea, and much lighter winds, will be experienced by hugging the coast by short boards, and at times even land breezes may very much facilitate progress; but in the attempt to render these available, great caution should be observed, particularly between cape Balinhasai and cape Bojeador, as several dangers are said to exist in this locality near the shore.

The first strong gust of the monsoon will be experienced on clearing cape Bojeador, but this should not induce the navigator to stand farther westward than is necessary to weather the cape, when less wind will at once be experienced. This generally is the case on all lee shores backed by mountains, either resulting from obstruction, reaction, or the effect probably, after sunset, of counteracting land winds. Among the groups northward of Luzon there are no dangers which are not easily avoided, and no continuous strong breezes will be experienced, at all comparable in force, or attended by high sea, similar to those which prevail between cape Balinhasai and Hong Kong. On the contrary, good working breezes, and at times light winds prevail, enabling a well-conditioned sailing vessel to make about six degrees northing in eight days.

**Main route.**—Should the Main route be adopted the foregoing directions from Singapore as far eastward as the Natuna islands should be followed; then work to the northward, keeping as close to the western edge of the reefs as possible, where the current is generally favourable. Having arrived in the large space of open sea in the parallel of 12° N., northward of the great mass of central reefs, it is advisable, instead of beating to windward, to make to the eastward and work up the coast of Luzon as far as cape Balinhasai and thence direct for Hong Kong.

See charts, 1,077 [3,511] and 1,078 [3,512]; also "Ocean Passages."

Charts, 2,660<sup>a</sup>  
[2,678], 2,414  
[2,682].

**Eastern route.**—An alternative route for sailing vessels, and which affords a leading or fair wind and favourable currents nearly throughout, is *via* Carimata strait, southward of Borneo and Celebes, through Salayar strait, Pitt and Gillolo passages; thence eastward and northward of the Philippine islands. The islands, &c., bordering this route are treated of in Eastern Archipelago, Part I. and Part II.

### SINGAPORE TO GULF OF SIAM AND SAIGON.

—**South-west monsoon.**—In this monsoon the winds prevail between S.E. and West in Singapore strait, and sailing vessels will have no difficulty in sailing through to the eastward.

If bound to the gulf of Siam, having cleared Singapore strait, shape a course to make the Redang islands; and thence keep the western shore of the gulf aboard, passing inside Pulo Lozin and Koh Krah.

If bound to Saigon, steer to pass to the westward of Pulo Condore, making allowance for a current setting out of the gulf of Siam, whilst crossing the entrance of that gulf. Steer thence northward along the edge of the bank that fronts the mouths of the Mekong river, and extends to the entrance of Saigon river, keeping in a depth of 8 to 12 fathoms; if the water shoals under 7 or 8 fathoms haul off to the eastward, and it will immediately deepen, the soundings being regular on the edge of the bank.

Directions for making the land about cape St. James and for proceeding up the Don nai river to Saigon are given at page 411.

**North-east monsoon.**—Sailing vessels bound from Singapore to the gulf of Siam in the north-east monsoon generally pass between Great and South Natuna islands. Fast sailing vessels proceed between the Anamba and Natuna islands and endeavour to make Pulo Obi; thence for Pulo Dama if bound to Kamput in the gulf of Siam; or outside Pulo Panjang and Pulo Wai, direct for cape Liant, if bound to Bangkok. In February and March vessels frequently fall in with an easterly wind off Pulo Aor, that takes them to Pulo Obi.

The directions given for proceeding from Singapore to Hong Kong in the north-east monsoon, page 37, apply also to vessels bound to the gulf of Siam or to Saigon, until they have arrived to the eastward of Natuna islands, either by passing between the Great and South Natuna, or by the Koti passage.

**If bound to the gulf of Siam** proceed in a north-easterly direction to about long.  $111^{\circ}$  or  $112^{\circ}$  E., which can easily be done as the wind is invariably from North to N.N.W. as far as the meridian of cape Sirik, when it generally veers to the north-eastward; thence towards Pulo Obi. Little or no current will be experienced until lat.  $6^{\circ}$  or  $7^{\circ}$  N. is

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See charts, 1,077 [3,511] and 1,078 [3,512]; also "Ocean Passages."

gained ; then it will be found setting strong to the south-west, governed considerably by the prevailing winds. Charts. 2,660a  
[2,678], 661a  
[2,680].

In April and May the best passages to the gulf of Siam are made by keeping the Malay coast aboard ; but expect squalls, calms, and rain ; a weak current begins to set north-eastward about this period.

**If bound to Saigon** proceed north-eastward to about long. 112° E., thence to make cape Tiwan. From lat. 7° N. until about 70 miles eastward of the mouths of the Mekong or Cambodia river, a strong current will be found setting to the south-west governed considerably by the prevailing winds ; for when strong gales blow in the early part of this monsoon, the south-westerly current is stronger, and often runs 3 knots an hour. The tidal streams are regular, and set strong near the Cochin China coast during both monsoons.

In the latter part of March and April an easterly wind is often found eastward of the Anamba islands, that will take a vessel to Pulo Condore ; thence work to cape St. James westward of that island, keeping towards the Cambodia coast, which is very low, and can seldom be seen at night.

From abreast the mouths of the Mekong or Cambodia river, the ebb stream will be found setting to windward, greatly assisting vessels standing inshore ; but they should not stand near these mouths during the flood stream, and on no account shoal the water to less than 12 fathoms in the night. The lead should never be neglected when standing towards this low land, which may be seen from a distance of about 10 miles in clear weather.

The north-east monsoon often blows very strong on the parallel of Pulo Sapatu, and between it and the Cochin China coast, in December, January, February, and sometimes March, continuing for two or three days with a heavy sea and strong current, the sky being generally thick and hazy throughout. A gradual rise in the barometer is a sure indication of an increase in the strength of the monsoon.

Should the monsoon prove too strong to contend against, vessels may bear up for Pulo Condore, and anchor in Pulo Condore harbour, where good shelter will be found.

#### HOMEWARD (SOUTHWARD) ROUTES.—FULL-POWERED STEAM VESSEL.

**HONG KONG TO SINGAPORE.**—South - west monsoon.—Full-powered steam vessels after leaving Hong Kong, and passing about 30 miles west of Paracel islands and reefs, should steer to pass within sight of the land in the vicinity of Kulao Rai, keeping about 10 miles off shore as far as cape Padaran, when a course should be steered to pass about 3 miles east of Pulo Aor ; thence to Singapore strait.

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*See charts, 1,077 [3,511] and 1,078 [3,512] ; also "Ocean Passages."*

Charts, 2,670.  
 [2,678], 2,661a  
 [2,680], 2,414  
 [2,682].

At night in tolerably clear weather a vessel may pass near to Pulo Cecir de Mer, westward of the Catwicks and Pulo Sapatu, thence to Pulo Aor. During thick weather it is advisable to pass eastward of Pulo Sapatu.

Or the Main route may be taken as in the north-east monsoon.

**North-east monsoon.**—Full-powered steam vessels (in this the fair wind monsoon) on leaving Hong Kong, take the Main route, between Macclesfield bank and the Paracel group, thence eastward of Pulo Sapatu and Pulo Aor to Singapore. An alternative route is to pass about 30 miles westward of the Paracels, as in the south-west monsoon; thence to pass 15 to 20 miles east of cape Varella, and east of Pulo Sapatu; thence to Pulo Aor, and Singapore strait.

**Manila to Singapore.—Both monsoons.**—From Manila, steer to pass northward of the central dangers in the China sea, for Pulo Sapatu, thence direct for Pulo Aor and Singapore.

#### VESSELS WITH SAIL AND AUXILIARY STEAM POWER.

**HONG KONG TO SINGAPORE. — South - west monsoon.**—Vessels with sail and auxiliary steam power usually adopt the Inner route, page 33, by the Cochin China coast, as from Singapore to Hong Kong.

The route by the Palawan passage, page 37, may also be taken in these months.

**North-east monsoon.**—Vessels with sail and auxiliary steam power take the Main route between Macclesfield bank and the Paracel group, allowing for the south-westerly set when leaving the China coast; thence eastward of Pulo Sapatu and Pulo Aor to Singapore.

**GULF OF SIAM AND SAIGON TO SINGAPORE.—South-west monsoon.**—Vessels with sail and auxiliary steam power, if proceeding from Bangkok to Singapore, keep along the western shore of the gulf to Great Redang island; thence inside Pulo Brala and close along shore to Singapore.

From Saigon, steer along the Cambodia coast as far as the Brothers or Pulo Obi, then across the gulf of Siam to the Malay coast, and passing inside Tioman and Pulo Sibu, keep along the coast to Singapore strait.

**North-east monsoon.**—Vessels with sail and auxiliary steam power, from Bangkok steer along the eastern side of the gulf past Pulo Wai to Pulo Panjang; thence eastward of Pulo Brala to Singapore strait.

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*See charts, 1,077 [3,511] and 1,078 [3,512]; also "Ocean Passages."*

If from cape St. James, pass eastward of Pulo Condore and thence direct to Pulo Aor and Singapore strait.

Charts, 2,650a, b  
[2,678, 2,679],  
2,661a, b [2,680,  
2,681].

**Manila to Singapore.—Both monsoons.**—From Manila, steer to pass northward of the central dangers in the China sea for Pulo Sapatu, thence direct for Pulo Aor and Singapore.

**Labúan to Singapore.—Both monsoons.**—Along the Borneo coast to Tanjong Api, thence direct.

#### SAILING VESSELS.

**HONG KONG TO SINGAPORE. — South - west monsoon.**—It is a common practice for sailing vessels to work down the China sea at all periods of the south-west monsoon. After leaving Hong Kong the usual course is to stand towards Hainan, which will be often fetched without tacking, as the wind frequently blows for days together from the south-east or eastward in that part of the China sea ; from thence across Tong King gulf to the Cochin China coast. Land and sea breezes and smooth water generally prevail close to that coast, for which reason it is usual to work down as close to the shore as possible, taking advantage of every slant of wind, but being careful not to get too far off the land. It is sometimes possible to get as far to the southward as cape Padaran in this way, but generally after passing cape Varella the monsoon is found blowing very fresh, with frequent hard squalls out of the gulf of Siam, rendering it impossible to work much to windward. From cape Varella, or from cape Padaran if a vessel has been able to fetch it, stretch away to the southward—making a tack if necessary, to weather the West London or other shoals—till the coast of Borneo is reached, along which work, and pass out through any of the South Natuna channels. Stand across to Singapore, and to make sure of your land fall, keep well to the southward before closing Bentán, so as to allow for the current which runs sometimes as much as 2 miles an hour to the northward.

If the wind should be to the south-westward on leaving Hong Kong, a good passage may occasionally be made in the early part of the monsoon by standing to the south-eastward as far as lat. 15°N. and long. 115° 30' E. Thence south-westward of the Macclesfield bank, to Pulo Sapatu or to cape Padaran, and across the gulf of Siam to Pulo Aor and Singapore.

**North-east monsoon.**—Sailing vessels bound from China to Singapore, or to Gaspar or Banka straits, should in March and April adopt the Main route between Macclesfield bank and the Paracel group, which is the most expeditious in these months, allowing for the south-westerly set

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See charts, 1,077 [3,511] and 1,078 [3,512]; also "Ocean Passages."

Charts, 2,660a  
[2,678], 2,614  
[2,682].

when leaving the China coast. In passing Pulo Sapatu they should borrow to the eastward towards the Prince of Wales and other banks where the winds are more favourable than farther to the westward.

Vessels may pass either to the eastward or westward of the Catwick islands and Pulo Cecir de Mer. Thence passing westward of the Charlotte bank and the Anamba islands, they should steer to make Pulo Aor.

Should the weather be thick, and a fresh breeze blowing, when near Pulo Aor, round to under its lee, and wait a convenient time to bear up for the strait. The current between this island and the east point of Bentán sets about S.S.E., by which it often happens that vessels leaving Pulo Aor steer too much to the south, and are swept with the current and the ebb stream coming out of Singapore strait, so far to the leeward of Bentán, that they have been obliged to proceed round it, and come up through Rhio strait.

In March, during the latter part of this monsoon, the winds are steady from the eastward, the weather settled, and the current weak. In April the prevailing winds are also from the eastward, but are much lighter and accompanied with calms and squally weather; from the latter end of this month to about the middle of May the monsoon gradually breaks up.

### GULF OF SIAM AND SAIGON TO SINGAPORE.

—**South-west monsoon.**—Sailing vessels from Bangkok to Singapore should keep the western shore of the gulf of Siam aboard, passing inside the Redang islands, Pulo Kapas, and Pulo Brala. Southward of Pulo Kapas, keep in shore to avoid the current, and take advantage of the land and sea breezes.

From Saigon many good passages have been made by keeping the Cambodia coast aboard as far as the Brothers or Pulo Obi, and then crossing the gulf of Siam with a strong north-westerly wind until the Malay coast is reached. Afterwards, keeping close in shore, passing inside of the Tioman group, Siribuat, and Pulo Sibu, and thence to Singapore strait, taking advantage of the tidal streams, and the land and sea breezes which prevail during settled weather in this monsoon.

(The inshore channel extending from Pulo Sibu to Siribuat, and formed by a chain of islands and rocks parallel to the mainland, is a good and safe one, having but few hidden dangers, and good anchorage all the way through. See page 101.)

The above route is generally adopted from Siam and sometimes from Saigon; but the passage eastward of the Great Natuna, described below, is considered the best, particularly for large vessels.

Vessels leaving Saigon, from off cape St. James should steer to the south-westward until the regular monsoon breaks them off to the south-east. This may be accomplished by taking every advantage of the North,

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*See charts, 1,077 [3,511] and 1,078 [3,512]; also "Ocean Passages."*

and N.E. winds, which frequently blow at night, and in some parts of the day, within a short distance of the coast. These local winds often carry vessels 40 or 50 miles south-westward of Pulo Condore without any interruption.

While standing to the south-eastward the full strength of the north-easterly current will be met with about the Charlotte bank; it gradually decreases and becomes slightly favourable when north-eastward of the Great Natuna. In this locality S.E. and easterly winds will generally be met with, and fast sailing vessels frequently pass through the channel between Subi and Low island, and into Singapore strait.

Strong westerly winds, with rain, frequently blow during the early part of this monsoon, and from this cause or from proceeding 2° or 3° eastward of the Great Natuna with scant southerly winds after leaving the Cambodia coast, dull sailing vessels have often made the northern part of Borneo about the meridian of cape Sirik. When this is the case, make for Api passage, keeping the north-west coast of Borneo aboard from Tanjong Datu until the Burong islands are reached. This will be accomplished without difficulty, for strong land and sea breezes prevail, and the current is weaker near the coast. (Many vessels, through leaving the coast of Borneo too soon, have fetched no higher than Pulo Aor or Pulo Tioman.)

The current in the offing runs strongly to the northward and through Api passage. Vessels coming through this passage should not shoal to less than 12 or 14 fathoms water between Tanjong Datu and Tanjong Api, nor pass these points nearer than 2 or 3 miles; and should be ready to anchor in the passage or off any other part of the coast, as the tidal streams are greatly influenced by the current, which often changes without warning.

Leaving the Burong islands, pass either northward or southward of the Tambelan group. Should the wind be scant from the south-west after leaving these islands, endeavour to make Pulo Panjang, off the east side of Bentan island.

**North-east monsoon.**—From Bangkok, the passage down the gulf will frequently be shortened in the north-east monsoon, by sighting Kusrovie rock, and passing between Koh Tang and Koh Tron. Thence keep well to the eastward of Pulo Panjang, and if bound to Singapore the passage will be made quicker by steering well out into the China sea; thence to pass about 20 miles eastward of Pulo Brala, and eastward of Pulo Aor; from the latter steer for Barbukit hill, so as to allow for the southerly current setting across the strait.

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See charts, 1,077 [3,511] and 1,078 [3,512]; also "Ocean Passages."

Chart. 2,650a  
[2,678].

Approaching Pulo Tioman at night or in thick weather, a good lookout should be kept and allowance made for the current setting to the south-westward ; as vessels have several times been found close to the north end of that island when the reckoning has placed them well to the eastward of it.

From Saigon, when off cape St. James shape a course to pass eastward of Pulo Condore, and thence direct to make Pulo Aor. From Pulo Aor to Singapore proceed according to directions previously given, from Hong Kong, page 44.

**A WIRELESS TELEGRAPH STATION** is established at Kavite naval station, Luzon, which receives messages at all hours day and night. U. T. are the call letters for Kavite; the call to a station should be made at a distance not exceeding 75 miles from it.

Messages will not be accepted for transmission to ships whose owners have not agreed to accept unpaid messages, unless a sufficient sum is deposited to cover all charges.

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*See charts, 1,077 [3,511] and 1,078 [3,512] ; also "Ocean Passages."*

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## CHAPTER II.

### SOUTHERN PART OF THE CHINA SEA.

(From the Equator to lat.  $2^{\circ} 10' N.$ )

WEST COAST OF BORNEO; PADANG TIKAR TO TANJONG DATU.—ISLANDS AND DANGERS BETWEEN BORNEO AND SINGAPORE STRAIT.

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**THE WEST COAST OF BORNEO**, as far northward as Padang Tikar river, is described in China Sea Directory, Vol. 1. It is under Dutch protection as far north-westward as Tanjung Datu. Chart 941a [2,557]. Var.  $2^{\circ} E.$

From Padang Tikar river the coast trends in a northerly direction for a distance of about 40 miles to the Little Kapuas river.

The Membavang, Punur, and Little Kapuas, shallow streams, forming the delta of the Great Kapuas river, discharge into the sea along this coast, which is low and marshy.

The Ambavang mountains, situated about 14 miles northward of Padang Tikar river, may be seen in clear weather from a distance of 36 miles, and are therefore visible from Pontianak road. The shore is fronted by a mudbank to the distance of from 2 to 3 miles, with depths of less than 3 fathoms, which may be approached by the lead.

**Reported shoal.**—The master of the U.S. barque *Belmont* Lat.  $0^{\circ} 15' S.$  Long.  $108^{\circ} 23' E.$  reported, in 1894, that he passed a shoal, about half a mile in length with apparent depths of not more than 10 or 12 feet, lying with Pulo Datu, bearing N.N.E.  $\frac{1}{2} E.$ , distant about 25 miles.

**LITTLE KAPUAS (Pontianak river).**—The entrance of this river is in the position given; the town of Pontianak is situated about 12 miles up. Lat.  $0^{\circ} 2' N.$  Long.  $109^{\circ} 10' E.$

A mudbank with less than 3 fathoms, and steep-to, extends nearly 4 miles off the entrance.

**Bar-depths.**—The depth on the bar of this river is from 9 to 10 feet at high water springs, and at low water about 3 feet, over very soft mud.

The river Membavang has about the same depth on its bar.

The river is said to be navigable by small steam craft for about 200 miles; the current running out does not exceed the rate of  $3\frac{1}{2}$  knots. In

Chart. 941a  
[2,555].  
Var. 2° E.

Lat. 0° 6' N.  
Long. 109° 5' E.

the lower part of the river the current is less, and at times is overcome by the flood tide.

**Buoyage.**—A conical gas buoy, painted black, and exhibiting a white occulting light every twenty seconds, thus: light, ten seconds; eclipse, ten seconds, is moored on the north side of the entrance to the channel across the bar. Within this buoy the channel is marked by 7 stake beacons with cones on the starboard hand (coming from seaward), and by 9 similar beacons with balls on the port hand. Three of these beacons exhibit lights.

Batu Lajang is marked by a wooden beacon with ball.

**Directions.**—The deepest water, in 1900, was found on the northern side of the channel.

The anchorage in Pontianak road is about 5 or 6 miles from the shore, in a depth of about 4 to 6 fathoms, mud, abreast the river's mouth. Vessels do not usually anchor too near the buoy, but in about 5 fathoms of water; the current from the river keeping them generally across wind and sea they experience less ground swell than if they were closer in. From November to February, during the north-west monsoon, vessels should anchor well out, as in these months gales occur, accompanied by heavy seas which break in shallow water. During the south-west monsoon it is often impossible or very dangerous to communicate with the river.

The flood stream sets southward along the coast, and the ebb to the northward.

Lat. 0° 1' S.  
Long. 109° 19' E.

**The town** of Pontianak is about 12 miles from the entrance, near the junction of the Landak. The town is situated on low and marshy ground, and is partly inundated during high river, rendering it unhealthy.

Pontianak is one of the principal stations of the Dutch in Borneo.

**Produce.—Trade.**—The principal exports are gold, diamonds, birds' nests, wax, mats, ebony, pepper, sago, camphor, and trepang. Imports are rice, opium, metals, porcelain, cutlery, &c. Siamese and Chinese junks trade to Pontianak, but the principal trade is with Singapore and Batavia.

**Rainfall.**—Rain occurs in every month of the year; the average annual fall, compiled from a period of 17 years, is 127 inches. The greatest fall occurs in October, November, and December, and averages for that period, 15 inches per month; the least in July, about 6 inches, the amount gradually increasing towards the months first mentioned.

**Communication.**—The Dutch mail steamer from Batavia calls every 4 weeks.

**Supplies.—Coal.**—Bullocks, hogs, pigs, and poultry may be procured at Pontianak, and fresh water during the rainy season, but boats must go far up the river to procure fresh water during the dry season,

which makes watering here inconvenient. A small supply of coal is usually obtainable, but the supply is uncertain.

Chart. 941a  
[2,555].  
Var. 2° E.

**COAST.**—**Bangkai point** is the north extreme of the bay into which the Pontianak river discharges; it is fronted by a bank to the distance of about 2 miles; the bank is steep-to. The Peniraman hills lie about 4 miles within the bay, and further inland is mount Api; about 9 miles to the south-eastward of the latter is the conical and isolated mount Nara.

Lat. 0° 19' N.  
Long. 108° 55' E.

**Mempawah river** lies about 3 miles eastward of Bangkai point; the current is strong and always running out of the river. It is only navigable for boats. Near the town of Mempawah, a few miles up, the river is defended by two small forts, and barred by fishing stakes. The neighbourhood is somewhat elevated, is without jungle, and the ground very fertile.

**The anchorage** in the road is in a depth of 5 to 8 fathoms at about 4 or 5 miles off shore, westward of the point at discretion, bearing in mind that the depths decrease rather suddenly under 10 fathoms. The streams run at the rate of about 2 knots in the anchorage.

**The Coast** from Bangkai point trends northward for 30 miles, to Tanjung Batu Belat. It is generally low and at some distance within are ranges of hills, the most conspicuous of which are the three peaks of Montidun. Near Sedau Malang point, northward of Batu Belat, are the Menterado hills, extending in an easterly direction from the coast for about 12 miles. In the interior is mount Padang, 3,200 feet in height. At 11 miles from Bangkai point is Sangau point, between which is a bay about 2 miles deep with a small round islet near the shore named Penbungaan. The western part of this islet\* was used as an observation spot by the Riflemen.

Lat. 0° 24' N.  
Long. 108° 58' E.

At 6 miles southward of Batu Belat, and half a mile off Terajun point, lies Pulo Samasa with Keran islet about a quarter of a mile north-west of it. Jina, a high rock, lies off Teranjun point. The whole of the bay is fronted by a shallow mudbank, extending 2 miles or more off shore, seaward of the islets mentioned, and is steep-to.

**Tanjong Batu Belat**, the westernmost extreme of Borneo, is a low and prominent point with three hills immediately within it; to the northward are the Menterado hills before referred to extending 12 or 13 miles to the eastward. An islet and some rocks lie close off the point within the 3-fathoms line of soundings, which is nearly half a mile from the shore.

Lat. 0° 48' N.  
Long. 108° 51' E.

**A shoal** of small extent, with 2 fathoms water, and steep-to lies N.W.  $\frac{1}{2}$  N.  $1\frac{1}{2}$  miles from Tanjong Batu Belat, and East, northerly, from the north point of Pulo Kebun; there are depths of 12 to 15 fathoms between it and Pulo Kebun.

General chart, 2,660a [3,678].

E 32369.

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Chart. 941a  
[2,655].  
Var. 2° E.

Lat. 0° 17' N.  
Long. 108° 45' E.

A small reef, with a depth of  $4\frac{1}{2}$  fathoms over it, is situated 2 miles S.  $76^{\circ}$  W. from Batu Belat.

**OFF-LYING ISLANDS.** — **Pulo Setenjang**, lying about 11 miles W. by N.  $\frac{1}{4}$  N. of Bangkai point is three-quarters of a mile in length, nearly half a mile in breadth, and moderately elevated, having a depth of 6 to 8 fathoms close around, and 11 to 16 fathoms, clay bottom, at a short distance from it.

**Pulo Damar**, lying  $2\frac{1}{2}$  miles north-eastward from Setenjang, is a small round islet, moderately elevated and covered with large trees. Close around it are depths of 5 to 8 fathoms, increasing to 10 and 14 fathoms, clay, at a short distance to the westward.

**Pulo Temaju**, lying about  $2\frac{1}{2}$  miles westward of Sangau point, is about  $2\frac{1}{2}$  miles in length, by  $1\frac{1}{2}$  miles in breadth, considerably elevated, and of an irregular shape. On its north-west side are two small bays with white sandy beaches; the east and west sides are fronted by shallow water to about the distance of 3 cables.

Anchorage may be taken off its east side during the south-west monsoon; there is also good anchorage on the western side during the north-east monsoon.

The channel between Pulo Temaju and Borneo is clear, with depths of 7 or 8 fathoms, decreasing regularly towards the mainland.

Lat. 0° 37' N.  
Long. 108° 46' E.

**Pulo Baru**, lying about 8 miles north-west of Pulo Temaju, is about a third of a mile in extent with a reef of 9 feet near its north extreme. The depths around the island are very irregular.

**A shoal** with a depth of 16 feet, and 11 to 16 fathoms around, lies half a mile N.N.W. from Pulo Baru.

**Four-fathoms shoal.** — A shoal with 4 fathoms over it, and 8 to 11 fathoms around, lies about midway between Pulo Baru and Tanjung Batu Belat, with Pulo Samasa bearing E.  $\frac{1}{2}$  N., distant  $3\frac{1}{2}$  miles; Pulo Kebun, open on either side of Pulo Penata Kechil, leads clear of it.

**The Burong islands** are a group of five islands lying westward of Tanjung Batu Belat. Sailing vessels being becalmed or meeting with adverse currents may anchor in the space between Lamukutan, Kebun, and Penata Besar, in a depth of about 13 fathoms, or between the inner islands and the mainland; in the latter case it must be remembered that the bank fronting the coast is steep-to in most places.

Lat. 0° 48' N.  
Long. 108° 42' E.

**Pulo Lamukutan**, the largest and westernmost island of the group, is  $4\frac{1}{2}$  miles in length, and about a mile in breadth; it is high, with several peaked hills, and situated about 9 miles from the mainland. Shallow water extends about a quarter of a mile from the north part of the island and in places off its east side.

There is anchorage in 5 or 6 fathoms abreast the two small bays on the east side of Lamukutan, but it will be necessary to approach the shore with caution as the depths decrease rather suddenly from 17 fathoms. There are depths of 5 to 6 fathoms near the western shore.

**Pulo Landean**, the southernmost of the group, is an islet, barely a quarter of a mile in diameter, lying about three-quarters of a mile southward of Lamukutan, with a reported depth of 4 fathoms in the channel between. There are depths of about 4 fathoms around the island, and from 10 to 12 fathoms at a short distance westward and southward.

**Pulo Penata Besar**, 2 miles in length, and two-thirds of a mile in breadth, lies 1½ miles eastward of Pulo Lamukutan. Near the east and west sides of Penata Besar there are depths of 4 to 8 fathoms, except off its north point, where the water is shallow. In the channel between these islands the depths are 17 to 25 fathoms, decreasing to 13 fathoms northward of Pulo Penata Besar.

**Pulo Penata Kechil**, situated a mile eastward of Penata Besar with deep water between, is about half a mile in extent; upon each side of its south-east extreme is a small bay. At half a mile southward of the island there is a patch of 4 fathoms with 6 and 7 fathoms close-to; the depths are irregular southward of it.

**Pulo Saluas**, a small round islet, lies half a mile N.N.E. of the north end of Penata Kechil; it is not advisable to pass between them.

**A shoal**, with a charted depth of 3½ fathoms, lies about one-third of a mile N.N.W. from the north point of Pulo Penata Kechil, and extends about N. ¼ E. 1½ miles where there is 5 fathoms; the depths around it are very irregular.

Caution is necessary when passing near this danger, as it is not certain that the least water has been obtained.

**Pulo Kebun**, the northernmost island of the group, is situated about 4 miles east-north-east from the north end of Lamukutan, and nearly 3 miles from the mainland. It is about 1½ miles in length, one mile in breadth, and high, with 6 to 8 fathoms near it, except off its south end where the depth is 3 fathoms, with 4 fathoms about three-quarters of a mile from it. A patch of 4 fathoms lies about half a mile off the north-west point of Pulo Kebun.

Lat. 0° 50' N.  
Long. 108° 47' E.

**Tides.**—It is high water, full and change, at the Burong islands at 4h. 45m.; springs rise 7 feet. The streams run with a velocity of about 2 knots an hour in a south-east and opposite direction.

**Directions.—Borneo coast.**—It will frequently be found convenient for a sailing vessel to keep tolerably close to the coast of

Chart 941a  
[3,655].  
Var. 2° E.

Borneo, especially when working to windward against the north-east monsoon, as favourable tidal streams will be found near the shore when a strong current is running to the southward some distance from it. Between the Masien Tiga islets and Bangkai point, a vessel may stand towards the coast, guided by the lead, into 7 or 6 fathoms; farther out, between the Greig shoals and Pulo Datu, the depths are 18 to 20 fathoms.

Small vessels may pass in safety between Fulu Temaju and the mainland, the channel being a mile wide with depths of 7 and 8 fathoms.

Between Temaju and Samasa, all vessels may stand towards the coast into 7 fathoms, and pass on either side of Pulo Baru; avoiding the shoal north of it, as convenient. Northward of Samasa the channel is clear as far as Tanjung Batu Belat; abreast this point the depths decrease suddenly from 13 fathoms to 8 and 4 fathoms and must be guarded against; thence it is advisable to pass between Pulo Kebun and the 2-fathoms shoal in the fairway.

The Burong islands may be boldly approached from the westward; large vessels had better pass outside them but small vessels may often with advantage pass between them, taking care to avoid the 3½-fathoms shoal to the northward of Penata Kechil.

\*Lat. 0° 49' N.  
Long. 106° 51½' E.     The COAST from Tanjung Batu Belat\* trends in a north-easterly direction for about 5 miles to Sedau Malang, a high and salient point; at about 2 miles to the eastward is the Sedau river. Bila point at 18 miles farther northward, forms the southern entrance point to Sambas river.

**Shoal.**—The shore of the bay between these two points is low and fronted by a bank with less than 3 fathoms to the distance of two miles; the same distance off the Selakau river is an isolated patch of 2 fathoms, steep-to; the depth decreases gradually towards the bank in other places.

Several rivers discharge into this bay, the most important of which are the Sengkawang, and the Selakau.

**Sengkawang.**—The town of Sengkawang, on the river of that name, is one of the military stations of the Dutch upon this coast, and there are usually about 500 soldiers, Europeans and natives, quartered there.

Inland are the large towns of Menterado and Salakan. Between the rivers Sambas and Landak there is a large Chinese population estimated at about 40,000, engaged in gold and diamond mining and agriculture. Gold is plentiful in this part of Borneo.

Lat. 1° 11' N.  
Long. 108° 55' E.     **SAMBAS RIVER** entrance lies between two sharp hills named Bila and Kalambau points, and is one mile wide.

The river forms a conspicuous break in the land, and with the hill southward of the entrance, and Raja hill 4 miles to the northward, off which lies Pontianak islet, 115 feet high, is easily identified.

There are two islets and several rocks off the north point of the entrance.

**Outer anchorage.**—It is advisable to bring up just southward of the parallel of Pontianak islet, as the shore bank is more shelving into a depth of 4 fathoms, and a vessel can anchor closer in there than abreast of Bila point. A good position is in a depth of from 6 to 12 fathoms with Raja hill bearing about E.N.E., or the river entrance about S.E.  $\frac{3}{4}$  S.

**Depths.—Bar.**—The entrance is fronted by a bar, with its outer edge  $2\frac{1}{2}$  miles seaward of Bila point.

The depth on the bar at low water springs is about 8 feet, and it is stated that vessels of  $12\frac{1}{2}$  feet draught can enter at high water springs under favourable circumstances.

Within the bar there are depths of 2 to 4 fathoms, to the junction of the Little Sambas, a distance of 12 miles. The Little Sambas leads to the town of Sambas; it is very winding, but deep except in one place near Seminis creek, where a reef obstructs the passage. This reef has 9 feet over it at high water, but there is apparently deeper water to be found by marking this danger. From the junction, the main branch of the Sambas continues its north-east direction for about 7 miles, where it is joined by the Serabie.

A wreck lies in the Little Sambas, in the position given approximately, Lat.  $1^{\circ} 17' N.$ , Long.  $109^{\circ} 12' E.$  eastward of which is a navigable channel 82 feet wide with a depth of 8 feet at low water; the rise of tide here is from 3 to 5 feet.

**Buoys.**—A black conical buoy surmounted by staff and ball, is moored outside the bar to indicate the channel, which is further marked by a white conical buoy and two black can buoys.

**TOWN.**—The town of Sambas is about 27 miles from the mouth of Sambas river at the confluence of Little Sambas and the Salako. It is governed by a Rajah, and is fortified. Since the latest treaty with the Netherlands Government, the Dutch have claimed this place as their right.

In this neighbourhood are the richest mines in Borneo; the exports consist of gold, diamonds, birds' nests, ebony, and wax.

**The COAST** from Sambas river trends in a gradual curve to Tanjung Pajung,\* or Semut, 26 miles north-eastward of Tanjung Bila, and is low. The depths off it decrease gradually towards the shore from 16 to 8 and 4 fathoms; within the latter depth, which is about 2 miles off Pajung, the depth decreases suddenly. Raja hill on the coast is isolated, and makes as an island from the westward.

Between Tanjung Pajung and Tanjung Api, 25 miles to the north-eastward, is Tanjung Belimbang, within which is Palo river. The shallow bank fronting this river extends 4 or 5 miles off, reduced again to about 2 miles off Tanjung Api. The Palo hills, situated a few miles within the

Charts, 941a  
[2,555] 2,104  
[2,558]  
Var. 2° E.

Lat.  $1^{\circ} 11' N.$   
Long.  $108^{\circ} 55' E.$

Charts, 2,104  
[2,582], 1,746  
Var. 2° E.

river, are conspicuous objects from a considerable distance. There are three distinct peaks, some 2,000 feet in height. The coast abreast should be given a berth of 7 or 8 miles.

\*Lat. 1° 50' N.  
Long. 109° 14' E.

**Palo river.—Buoyage.**—A black conical buoy, surmounted by staff and ball, is moored off the entrance to Palo river,\* in a depth of 6 fathoms, with the south-west extremity of Tua island bearing S. 12° E., distant  $5\frac{1}{4}$  miles. The fairway channel into the river has a depth of 11 feet in it at low water springs. There are eddies on the flood in this channel.

Lat. 1° 57' N.  
Long. 109° 18 $\frac{1}{4}$  E.

**Tanjong Api**, the south-western point of Api passage, is a low sandy spit, on which are several high and black basaltic rocks which serve to identify it. The coast eastward is a sandy beach. The extreme of the point to the south-westward is readily distinguished from either northward or southward by its abrupt termination, formed by the stems of large trees, as well as by a hummock within.

**Reef.**—A reef, in the shape of a horse-shoe, with the bight to the eastward, extends  $1\frac{1}{2}$  miles northward, westward, and north-eastward from Tanjong Api; there are many sunken rocks on it, one lying near its extreme; the reef is steep-to.

The entire range of the Datu mountains open northward of the mangroves on the coast westward of Tanjong Datu, bearing E.  $\frac{1}{2}$  N., leads northward of Api reef.

**Landing.—Water.**—The best landing will be found about 60 yards southward of the great northern rock, where the beach is clear; here the point is protected in a great measure by beds of rock immediately in front of it.

Good water was formerly obtainable from a pond lying parallel to the river, near the point. The river being blocked by sand causes an accumulation of water in its mouth, from whence it percolates through the sand to the pond. The trees here furnish good spars and planking for boats.

**Anchorage.**—There is good anchorage in a depth of 14 fathoms, with Api rocks bearing S.E. by E. distant about 2 miles.

**Tides.**—The tide at Tanjong Api rises about 7 feet; the direction of the flood at 2 miles off shore was found to be E.N.E., and the ebb S.S.W. from 2 to  $2\frac{1}{2}$  knots.

The coast trends east-north-eastward from Tanjong Api to Tanjong Datu, a distance of 22 miles, forming the south side of Api passage. A considerable portion of it is sandy beach fronted by mangroves. The space within the line of the two points has not been satisfactorily

examined, and there is every reason to apprehend from the irregularity of the soundings taken that undiscovered rocks may exist. The shallow depths near the fairway are referred to with Api passage, page 88.

**Tanjong Datu** is the termination of a mountainous peninsula about 5 miles in length; its summit is named mount Datu. Within the peninsula the land is again low, but at 12 to 20 miles inland is another range, attaining a height of 5,886 feet.

The whole of the west side of the peninsula, and about 3 miles of the eastern side, from the point, is fronted by reefs and rocks above water to a short distance, rendering landing difficult. Southward of the shore reef on the eastern side are two sandy bays.

**Reefs.**—Dangerous sunken rocks, some nearly awash, extend about 2 miles off Tanjong Datu, with depths of 8 to 10 fathoms between and a short distance beyond, and from 10 to 15 fathoms between them and Niger bank.

**Niger bank** composed of hard clay, is  $4\frac{1}{2}$  miles in length, east and west, and  $1\frac{1}{2}$  miles in breadth. It has depths of 5 to 9 fathoms, and is convenient to anchor upon to await a favourable tide. The outer edge of the bank lies about North, distant 5 miles from Tanjong Datu.

Coast continued on page 132.

#### ISLANDS AND DANGERS BETWEEN BORNEO AND SINGAPORE STRAIT.

**General remarks.**—It was observed, from H.M. surveying vessel *Riflemen*, when surveying in the neighbourhood of these islands in 1862, that during the south-west monsoon (from the middle of July to the middle of September), and also during the north-east monsoon (in the month of December), that the tidal stream sets to windward some portion of each day against the prevailing current, although uncertain as to commencement and time of duration. The weather was fine and the winds generally light.

Sailing vessels would frequently shorten their passages through this part of the China sea if they kept a kedge ready to anchor during light airs and calms, and when both current and tidal stream would otherwise be setting them back over the ground they had with difficulty gained.

Most of the islands are covered with a dense vegetation, and have generally white sandy beaches upon which turtle may be found in the proper season. The islands of the St. Esprit group and others are occasionally visited by small parties of Malays for the purpose of catching turtle. The only islands permanently inhabited are those of the Tambelan group.

Directions for navigating between Singapore and Tanjong Api will be found on pages 33, 35 and 36.

General chart, 2,600 $\times$  [2,675].

Chart, 941a  
[2,555].  
Lat. 0° 7' N.  
Long. 108° 37' E.  
Var. 2° E.

**Pulo Datu**, 1,007 feet high, situated W.  $\frac{1}{2}$  N. 33 miles from Pontianak river entrance on the west coast of Borneo, is a good landmark for approaching that river; the summit of the island, which is at the eastern end, appears from a distance as a conical mountain. The island is  $1\frac{1}{2}$  miles in length, and three-quarters of a mile in breadth; some sunken rocks lie close to it, but at a short distance there are depths of 13 to 20 fathoms.

Lat. 0° 1' S.  
Long. 108° 38' E.

**A reef** with a depth over it of less than 16 feet, is situated (approximately) 7 miles southward of Pulo Datu.

Lat. 0° 15' N.  
Long. 108° 2' E.

**Direction island** or Pulo Pengiki Kechil, 639 feet high, lies W.  $\frac{1}{2}$  N. 36 miles from Pulo Datu. An islet lies nearly half a mile off the south-west extreme of Direction island, with depths of 10 to 17 fathoms in the channel between. The depths around these islands are irregular.

**Welstead rock**, lying 19 miles N.N.W.  $\frac{3}{4}$  W. from Direction island was discovered in 1825 by Mr. G. Welstead, commanding the ship *General Harris*, which grazed over it.

The rock is half a mile in length, and about a cable in breadth, consisting of a number of pinnacles having depths of 3 to 7 fathoms over them, and 17 to 23 fathoms close around.

Lat. 0° 55' N.  
Long. 107° 54' E.

**Alida shoal**.—The barque *Alida*, 1897, drawing  $18\frac{1}{2}$  feet, touched on a shoal, reported to be situated about 20 miles eastward of the Tambelan islands; the bottom was distinctly seen from the vessel.

Lat. 0° 31' N.  
Long. 107° 26' E.

**Ebeling shoal**.—Mr. Ebeling, commanding the Chilian ship *Mercedeo*, in 1863, reported having sounded in  $4\frac{1}{2}$  fathoms upon a coral shoal, and whilst the lead was being hauled in the vessel passed over one side of a patch upon which there appeared to be as little as 3 fathoms of water. Position by bearings given:—St. Barbe island, S.  $27^{\circ}$  W., middle of St. Esprit group N.  $80^{\circ}$  W., Pulo Gigang Besar N.  $13^{\circ}$  E.

Lat. 0° 7' N.  
Long. 107° 13' E.

**St. Barbe island**, or Pulo Pengiki Besar, 762 feet high, is situated 49 miles W. by S. of Direction island. It is about 3 miles in length, and when first seen appears like two or three islands, being lower at the centre than at the north-east and west parts.

The south point of the island is cliffy and bold, but a reef encumbers the first bay on its east side. The west side of the island is divided into two small bays, having reefs in them near the shore. Off the north-west point of the island are two or three small rocks a few feet above water, and a reef projects about a quarter of a mile from the point to the northward of it. A small rock above water lies near the middle of the large bay on the north side of the island, and a third of a mile north of this rock is another, sometimes awash, with depths of 10 and 17 fathoms close-to; the shore is fringed by a reef. A small rock above water also lies close to the east side of the north point of the island.

The depths near this island are irregular, varying from 17 to 40 fathoms. Chart 941a [2,553].

**Water** and wood may be procured in a bay on the east side of the north-west point of St. Barbe, and also near the south-east point; as the shore is fronted by a reef, boats can only land at high water, at which time casks may be rafted off.

**Tides.**—It is high water, full and change, at 6 h., springs rise about 6 feet.

**The ST. ESPRIT GROUP**, or Atas islands, lying north-north-westward of St. Barbe, consists of a dozen small high islands and islets, extending about 12 or 13 miles in a west-north-west and opposite direction; between the islands are deep channels.

**St. Esprit** or Kepajung, the largest and northernmost of the group is 82 feet in height, and about  $1\frac{1}{4}$  miles in length, by three-quarters of a mile in breadth. It is nearly surrounded by a reef extending to a short distance, with depths of 25 to 50 fathoms at a little beyond it.

**Centre island**, 167 feet high, is small and round, and lies about two-thirds of a mile from St. Esprit island. A reef surrounds it to a short distance, close to which there is a depth of 30 fathoms.

**Bush island**, 393 feet high, the westernmost of the group, lies about 2 miles west-south-west from the south end of St. Esprit island; the channel between appears free from dangers. An islet lies a short distance southward of Bush island, and some islets and rocks lie close to its east extreme; an islet, 110 feet high, named Clump, lies about half a mile northward of its north point.

**Head island**, 372 feet high, situated near the centre of the group, is of irregular shape; the north side forms a bay. The channels on either side of Head island appear to be clear of danger.

**Royalist rock**, with less than 6 feet water, and 38 to 40 fathoms close-to, lies with the north-east extreme of Head island, bearing S.S.W.  $\frac{1}{2}$  W., distant a mile, and the apex of the northern Brace island S.E. by E.  $\frac{1}{4}$  E., a little over 4 miles.

**Brace islands** comprise two small islands, about three-quarters of a mile apart, and a larger island 572 feet high, a mile north-west of them; the easternmost Brace island is the easternmost of the St. Esprit group. Some rocks extend a short distance in a north-east direction from the middle island; the others are steep close-to, with depths of 23 to 33 fathoms at a short distance from them. The channels between these islands are also deep and clear.

**A shoal**, with 3 fathoms water, and 7 to 8 fathoms close around, lies about half a mile W.S.W. from the northernmost Brace island.

Lat. 0° 30' to  
0° 40' N.  
Long. 106° 58' to  
107° 11' E.

Charts, 941a  
[2,555], 361  
[2,578].  
Var. 2° E.

Lat. 0° 31' N.  
Long. 107° 9' E.

**Round island**, 311 feet high, lies about 3 miles westward of the northernmost Brace island ; about a mile westward of Round island lies an island about one mile in extent ; there appears to be deep water around and close to these islands.

**South-east island**, 145 feet high, is a quarter of a mile in extent, and connected by a reef to a low white rock which lies a quarter of a mile northward of it. Close to the island the depths are irregular, 14 to 32 fathoms ; between it and the Brace islands the depths are also irregular, 24 to 33 fathoms, with a patch of 11 fathoms about 1½ miles from South-east island. Between South-east island and the large island next west of the Brace islands the depths are more regular, 28 to 30 fathoms.

**South-west island**, 305 feet high, is small, and apparently steep-to ; close to the southward of it are depths of 30 to 34 fathoms.

**Doubtful dangers.**—**Howqua shoal** is a doubtful danger reported in 1858 to lie 4 miles S. ¼ W. from South-west island. It was unsuccessfully searched for by the *Riflemen*, which steamed over and about its reported position for a whole day ; the soundings in the vicinity are from 31 to 36 fathoms.

Lat. 0° 30' N.  
Long. 106° 38' E.

**Discoloured water**, having the appearance of a shoal, was seen from the German ship *Rebecca*, 1875, about 19 miles west-south-westward of Bush island. The Ebeling shoal to the eastward of the group has been previously dealt with.

**THE TAMBELAN ISLANDS** comprise a considerable number of islands, and form two groups, about 4 miles apart, each extending north-west and south-east about 13 or 14 miles. See views on chart 361 [2,578].

Lat. 1° 0' 27" N.  
Long. 107° 24' 10" E.

The **Observation spot** used by H.M.S. *Riflemen* in the survey of 1862, was at the north extreme of Pulo Tamban.

Plan of Tambelan creek on chart  
361 [2,578].

**Anchorages.**—There is good anchorage between the two groups of the Tambelan islands, which form an extensive basin ; the depths being generally 17 to 20 fathoms, mud and sand. During the north-east monsoon a vessel may anchor in the entrance to Tambelan creek, avoiding a pinnacle rock covered with 12 feet water, which lies S.S.E. nearly a quarter of a mile from Suicides point ; this position would be unsafe in the south-west monsoon. The best anchorages during the south-west monsoon are in depths of 9 to 14 fathoms in the bay on the north side of Bunoa island, or in 14 to 18 fathoms in the bay between Pulo Gilla and Bunoa.

Lat. 1° 0' N.  
Long. 107° 33' E.

**Settlement.—Supplies.**—The village near the head of Tambelan creek is inhabited by about 500 Malays, and the other islands of the group are temporarily inhabited for the purpose of collecting cocoanuts.

There is a well of good water just northward of the mound on the south side of Tambelan creek entrance, and another on the north side about 2 cables northward of Suicides point. A few fowls and goats are bred upon these islands, but a supply cannot be depended on.

**South-western group.—Gigang islands.**—Gigang Besar or Jarrang, the south-easternmost island of this group, is  $1\frac{1}{4}$  miles in length, by two-thirds of a mile in breadth, and is bordered at a short distance by a reef. It is a high island, rising to a peaked hill in the centre,\* and having a lower peak near each extreme. Gigang Kechil, an island about one-eighth the size of Gigang Besar, lies a mile westward of it, and is also fronted by a reef, which off its north end projects nearly a quarter of a mile.

**A Coral shoal** about 6 cables in length, and steep-to, lies off the south-west end of Gigang Kechil, separated from it by a narrow channel of 17 to 20 fathoms water. The shoal has two beads; the western has a depth of 3 fathoms, and the eastern head of 4 fathoms.

Tambelan highest peak in line with the eastern extreme of Harbour island, bearing N.N.E., leads half a mile westward of the shoal, and White rock, open of the southern extreme of Gigang Besar, leads to the southward.

**White rock**, about 80 feet high, lies E. by S., about 5 miles from the south end of Gigang Besar, the southernmost island of the Tambelan group; on its south-west side are two pinnacle rocks about 12 feet high; foul ground extends two cables from White rock in directions between N.W. and S.W., the depths near being 14 to 20 fathoms.

**Rodger rock**, about  $12\frac{1}{2}$  miles E. by S.  $\frac{1}{4}$  S. of Green island, on which the ship *Ellen*, commanded by Mr. Alex. Rodger, struck in 1845, is about 100 yards square, with a depth of 3 feet. From the centre of the rock Tambelan peak is seen over the summit of Pulo Gigang Besar, bearing N.  $\frac{1}{4}$  E., the south point of the latter being distant 11 miles.

This is a very dangerous rock, as there are regular depths of 19 to 22 fathoms close-to and at a distance of 2 or 3 miles around. The *Riflemen* was steaming in the vicinity of this rock for four days, when it was ultimately discovered by the tidal stream setting against the wind causing a slight ripple.

**Green island**, about 15 miles S.W. by W. of Gigang Besar, is about a third of a mile in extent, covered with trees, has a white sandy beach, and is surrounded for a short distance by a reef, having depths of 15 to 20 fathoms close-to.

**Harbour island.**—At the distance of 3 miles north-west of the Gigang islands is a group of small islands, the north-eastern of which, Harbour island, or Pulo Smot, not quite half a mile in extent, limits the

Charts 381 [2,578], narrowest part of the channel between the two main groups of the  
 941a [2,555].  
 Var. 2° E.  
 Tambelan islands.

**Pulo Bedua.**—At two-thirds of a mile westward of Harbour island  
 • Lat. 0° 56' N.  
 Long. 107° 29' E. lies Pulo Bedua which has four hills upon it, the highest, 408 feet high,  
 being near its west end.\*

Close to the southward of Bedua are two small islands, Untup and Lepi. A reef surrounds Bedua, and embraces Untup, extending from about a cable outside the eastern extreme of the former to about the same distance outside the south-eastern extreme of the latter.

The channel between Bedua and Harbour island is clear, with depths from 17 to 22 fathoms. Kapala Tambelan is a small island lying 2 miles south-westward of the Bedua group, and about a mile from the southern part of Bunoa.

The channel between the Gigang islands and the Bedua group is free from danger, with soundings of 16 to 23 fathoms. A coral bank with 7 to 10 fathoms water over it, and 16 to 20 fathoms around, lies about 1½ miles S.W. by W. ¼ W. from Kapala Tambelan, which island may be passed on either side.

Lat. 0° 55' N.  
 Long. 106° 28' E. **Patch.**—At three-quarters of a mile westward of Lepi is a patch of 3 fathoms, upon a bank having 4 to 18 fathoms on other parts of it.

**Bunoa**, by far the largest island of the south-western group, is nearly 4 miles in length by 2½ miles in breadth. Its highest part, near its north-east end, is elevated 915 feet, and there are several other hills upon it from 300 to 700 feet high. The north coast of the island forms a bay, in which vessels may anchor in depths of 10 to 16 fathoms, with good shelter in the south-west monsoon period.

Close to the east side of Bunoa are two smaller islands, Selindang and Gilla; Selindang is a remarkable cone-shaped island, attaining an elevation of 681 feet; Gilla is about a third of the height of Selindang.

Lat. 1° 1' N.  
 Long. 107° 21' E. **Islands westward of Bunoa.**—The group of ten islands extending nearly 5 miles to the north-westward of Bunoa are all tolerably elevated, and Mundaga, the westernmost, is 697 feet high.\* The channels between are deep and considered to be generally free from danger, but that between Bunoa and Ebul cannot be recommended, for the strong eddies and ripplings led the officers of the *Riflemen* to infer that dangers existed in it, although, after a careful search, 4 fathoms was the least water found; it is however possible that a small shoal may have escaped the lead, and this channel had better be avoided. A reef extends some distance from the northern side of Ebul, nearly to Pening. A rock awash lies about a third of a mile from the south-west extreme of Leso, the island lying close to the western part of Bunoa; elsewhere these islands appear free from danger.

**North-eastern Group.—Tambelan**, the largest island of this group, is of triangular shape, and nearly  $4\frac{1}{2}$  miles in extent. Upon its north-east coast are several hills, the highest of which, Tambelan peak,<sup>#</sup> attains an elevation of 1,300 feet, and is visible from a considerable distance in clear weather. A short distance to the eastward of Tambelan peak is Thumb peak, a remarkable sloping hill, 953 feet high. East peak, a sharp cone, 950 feet high, rises near the eastern extreme of the island.

Charts 361 [2,578],  
941a [2,555].

Var.  $2^{\circ} E.$   
Lat.  $1^{\circ} 1' N.$   
Long.  $107^{\circ} 32' E.$

The north coast is almost free from reef; but a small islet lies half a mile off shore, about the middle part of the coast, with another small islet close inshore abreast it. A reef extends from the east point of Tambelan island, and upon its edge, half a mile southward of the point, is a rock which dries. Reefs fill up the bays on the south-east coast of the island. A reef, with a rock awash on its extreme, extends about one-third of mile from the south point of the island, thence fronting the coast into Tambelan creek. A reef also extends a third of a mile from Suicides point, the north entrance point of Tambelan creek, and fronts the coast, and surrounds the island which lies close to the western extreme of Tambelan island; thence the reef fronts the west coast at an average distance of about 2 cables to the north-west extreme of the island.

**Tambelan creek.**—Tambelan island is nearly divided into two parts by a creek, which runs in a north-easterly direction into its western side. The creek is nearly a mile wide, but fringed with reefs and encumbered with several rocks. A pinnacle rock, with 12 feet water, lies in the fairway S.S.E., nearly a quarter of a mile from Suicides point, as before mentioned with the anchorages. A breakwater, composed of coral, crosses its upper part, about  $1\frac{1}{2}$  miles within the entrance, leaving but a narrow boat channel, through which the tide sets with great strength. Behind the breakwater is a stockade, and a fort stands upon the shore near the west end of the breakwater. The whole of these works were constructed to defend the village, which is about half a mile within the breakwater on the western bank of the creek, from the attacks of pirates, who formerly visited these islands, and carried into slavery any of the natives they could capture; several were so carried off in 1860.

Plan on chart,  
361 [2,578].

**Pulo Bungin**, 253 feet high, is a small island, lying  $1\frac{1}{4}$  miles westward of the north-west point of Tambelan. Close to its east side is an islet from which a sandbank projects N.N.E. about a third of a mile, having a rock awash on its extreme, and a patch of 4 fathoms about 2 cables beyond it. A rocky patch of 4 fathoms, lies nearly half a mile south-westward of Bungin and irregular depths, 4 to 9 fathoms, surround that island, except on its north-west side, where deep water will be found close to the beach.

Lat.  $1^{\circ} 1' N.$   
Long.  $107^{\circ} 30' E.$

Charts. 361 [2,578].  
941a [2,535].

Var. 2° E.

**Sedua Besar**, 860 feet high, and Sedua Kechil, 650 feet high, lie from 1½ to 3½ miles north-westward of Tambelan island, separated from each other by a narrow deep channel; they are bold-to in most places. The channel between Sedua Besar and Tambelan appears to be free from danger on either side of Bungin, with general depths of 19 to 28 fathoms, but the soundings are scanty and irregular in places.

Lat. 1° 54' N.  
Long. 107° 26' E.

**Sendulang Besar** and **Sendulang Kechil**, lying 3 miles north-westward of the Sedua islands, are two small round-shaped islands, surrounded to a short distance by reef, and separated by a narrow channel. Sendulang Besar rises to a sharp cone, 749 feet high; the smaller island is only 309 feet high. The channel between Sedua Kechil and Sendulang Kechil has general depths of 23 to 25 fathoms.

**Pulo Wai**, the north-westernmost island of the group, is triangular, about 2 miles in extent, and rises to several peaked hills, the highest of which, near its eastern end, is elevated 1,057 feet. A reef with two rocks above water on it, extends about 2 cables in a north-easterly and half a mile in a southerly direction from its eastern extreme. The north and west coasts are fronted by reef to about 1½ cables, but its south side is almost clear.

Lat. 1° 11' N.  
Long. 107° 13' E.

**Rocky Islets**.—Lying W.N.W., distant 12 miles from the summit of Pulo Wai, are two barren rocks, about 2 cables in extent, and bold-to, with 30 fathoms water at a short distance. The northern and larger rock is 134 feet in height.

**Gap rock**, distant 11½ miles, N. ¼ E. from Tambelan peak, is remarkable; it consists of two large boulders lying on a flat rock, the larger of which is 124 feet in height; see view on chart. A shoal extends about 2 cables from its south side. Close around the rock are depths of 18 to 28 fathoms.

Lat. 1° 11½' N.  
Long. 107° 25½' E.

**Europe shoal** is about a mile in extent, with a least depth of 3 fathoms at about the middle of the shoal, from which Gap rock bears E. ¾ N., distant 9 miles, and the summit of Pulo Wai, S. by W. ½ W., distant 5½ miles. Around the shoal the depths are 15 to 25 fathoms.

Lat. 0° 56' N.  
Long. 106° 46' E.

**ISLANDS north-west and west of the Tambelan group**.—**St. Julian island**, about 37 miles westward of the Tambelan group, is nearly a mile in length, and 200 yards in breadth. It is low in the centre, rising to a hill 318 feet high on the south end, and to another 537 feet high on the north end, which latter forms a bold cliff to seaward. There is deep water close-to on all sides.

**Camel's Hump**, about 18 miles N.N.E. ¼ E. from St. Julian, is about a mile in length, and a third of a mile in breadth. It is well named, the highest part of the island forming a hump, 583 feet in height.

**Saddle island**,  $11\frac{1}{2}$  miles N.E.  $\frac{1}{2}$  E. from Camel's Hump, is half a mile in length, by a quarter of a mile in breadth. The hills forming its saddle are in line on a S.  $\frac{1}{4}$  W. and opposite bearing, the higher and northern one being 387 feet in height.

**Barren island** is a whitish rock, 80 feet high, about one cable in length, and without the slightest trace of vegetation. The island is steep-to, except on its north-west and south-west sides, where shallow water extends a quarter of a mile; on the latter side are two rocks above water. The island is the resort of varieties of sea-fowl, which in the season of incubation, deposit great quantities of eggs.

**Landing.—Water.**—Landing is said to be easy on the western side, but this possibly applies to the north-east monsoon period only; northward of the landing is a hole capable of holding about 10 gallons, into which water percolates from above and overflows to the sea. The sea birds render it unfit for consumption.

**Victory island**, about 8 miles west-north-westward from Barren island, is densely wooded, and attains a height in the centre of 285 feet; there are depths of 9 to 27 fathoms around the island. It forms a good landmark for vessels proceeding from Singapore to the north-west part of Borneo.

**Hughes shoal**, with  $3\frac{1}{2}$  fathoms least water and composed of coral, is one-third of a mile in length; its outer edge in 8 fathoms lies S.W.  $\frac{1}{4}$  W. three-quarters of a mile from Victory island; beyond this depth it is steep-to.

**Acasta rock**, situated 4 miles N. by W. from Victory island, is just below the surface of the sea, and in calm weather may only be seen by the discolouration of the water; the least swell, however, breaks on it.

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General chart, 2,660a [2,678].

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Charts 361 [2,578],  
941a [2,555].  
Var. 2° E.

Lat.  $1^{\circ} 32' N.$   
Long.  $106^{\circ} 20' E.$

Lat.  $1^{\circ} 39' N.$   
Long.  $106^{\circ} 18' E.$

## CHAPTER III.

### SOUTHERN PART OF THE CHINA SEA.

(From lat. 1° 30' N. to lat. 5° N.)

#### ANAMBA AND NATUNA ISLANDS—EAST COAST OF THE MALAY PENINSULA, WITH THE OFF-LYING ISLANDS AND DANGERS.

##### ANAMBA ISLANDS.\*

Charts, 1,371  
[2,579], 2,244  
[2,580].  
Var. 2° E.

**GENERAL REMARKS.**—These islands, the higher peaks of which are from 1,200 to 1,800 feet in height, and thickly clothed with dense forest to the very summits, consist of two large groups and several smaller ones, with numerous detached islets. The channels between the groups are safe and easily navigated. Many of the islands are inhabited, and the great abundance of cocoanut plantations is a very noticeable feature all over the group.

The export of cocoanuts in the form of copra forms the staple trade of the islands, which is carried on by means of small sailing schooners plying to Singapore and to Linga. Sago also is exported.

The natives everywhere appear to be perfectly harmless and peaceable, and well disposed towards strangers.

**Protectorate.**—The islands belong to the Sultan of Linga, are under the protection of the Dutch, and form part of the Rajahship of Rhio-Linga.

Lat. 3° 13' N.  
Long. 106° 13' E.

The principal village is Terempa on the north coast of Siantan island. The Dutch Government official resides here, and is in charge of the north-eastern group. The population of this section in 1890 was estimated at 4,593 Malays and 500 Chinamen. The south-western groups and off-lying islands are more thinly populated, the inhabitants being estimated at about 2,000.

The principal village of the south-western group is Kampong Kwala, situated at the head of Telok Kwala, on the east coast of Jimaya island.

**Supplies.**—Bananas, pine-apples, mangoes, betel-nuts, &c. are cultivated in the various islands, but not to any great extent. Goats,

\* The survey and directions for the Anamba islands are by Commander A. M. Field and the officers of H.M.S. *Egeria*, 1893.

General chart, 2,660a [2,678].

fowls, and water can be obtained at the larger villages. A large quantity of fish is caught by the Malays, both by traps and lines.

Charts, 1,371

[2,579].

2,244 [2,580]

Var. 2° E.

Lat. 3° 13' N.

Long. 106° 13' E.

**Caution.**—Although the survey failed to discover any dangers in many of the passages between the islands of a group, yet it was not of a sufficiently exhaustive character to justify vessels in attempting any such passages, and as a rule it is only the channels between the groups that should be made use of.

**Tides.**—It is high water, full and change in Salat Pananting (north-east group) at 10h. 0m.; springs rise  $7\frac{1}{2}$  feet, neaps rise 4 feet. In Impul passage (south-west group) it is high water, full and change at 9h. 0m., springs rise 6 feet, neaps rise  $3\frac{1}{2}$  feet. The remarks here apply particularly to the months of from June to October, inclusive, the time occupied in the survey.

The moon's declination has a great effect on the tides.

With a high declination N. or S. there is but one high water in 24 hours and one low water; with a low declination there are the ordinary two tides for a few days only. The times of high water of the single tides appear to follow the inferior transit of the moon when in north declination, and to follow the superior transit when in southern declination.

The single tides always appear to rise higher than the ordinary double tides, whether they occur at neaps or at springs. The phenomenon of two tides in the 24 hours will be most apparent when the time of full and change coincides approximately with the time of the moon having a low declination, and they may then occur for 5 or 6 days; under other circumstances they will occur for 2 or 3 days only.

**Tidal streams.**—During the stay of the *Egeria*, in the months of June, July, and part of October, the direction of the tidal stream was as follows:—The flood stream set to the southward and westward, and the ebb to the northward and eastward, these directions being modified by local circumstances. At neaps the tidal streams were weak and irregular. At springs they ran from one to 2 knots per hour.

The southerly stream began to run from 3 to 4 hours before high water, and the northerly (or ebb) stream commenced at from 3 to 4 hours after high water, but this was subject to an uncertainty of as much as 2 or 3 hours either way. The southerly stream usually ran for 13 or 14 hours, and the northerly stream for 10 or 11 hours.

**Winds and weather.**—During the month of June, southerly and south-westerly winds predominated, although occasionally northerly and north-easterly winds were experienced. Rain occurred on several days, but was neither heavy nor continuous.

In July considerably more rain fell and for longer periods. The winds were almost entirely confined to southerly and south-westerly directions.

General chart, 2,680a [2,678].

E 32369.

E

Charts, 1,371  
[2,579],  
2,244 [2,590].  
Var. 2° E.

In August the rainfall began to diminish, the winds still remaining southerly and south-westerly. Sharp and sudden squalls from the westward were occasionally experienced at night during this month, accompanied by rain.

In September very little rain fell, and it was altogether the finest month experienced by the *Egeria* in the Anambas. The southerly and south-westerly winds were more persistent and constant in direction than ever, occasionally blowing fresh from the southward.

In October the rainfall began to increase again, and the prevailing south and south-westerly winds were occasionally interrupted by easterly and north-westerly winds.

During the whole of the stay of the *Egeria* in the Anamba islands from June to October, the amount of cloudy weather and almost entire absence of sunshine for days together, was a marked feature.

The strength of the wind never exceeded a fresh breeze (force 5) and attained that not frequently.

The number of hours' rain in June amounted to 23, falling on 22 days; in July, 46, falling on 23 days; August, 28, falling on 23 days; September, 6, falling on 20 days; and October, 27, falling on 28 days.

The maximum barometric reading was 30°08 inches, and the minimum 29°84 inches. Maximum heat, 82°, minimum, 76°5°. Sea water, 81°6 to 84°6.

**The SOUTH-WESTERN GROUP** is comprised between White rock, the most southern islet of the group, and the parallel of about 3° 20' N.; and between Pulo Riabu, Pulo Buan, and Pulo Durai on the east and north-east, and Pulo Domar on the west.

\*Lat. 2° 44' N.  
Long. 105° 23' E.

**Pulo Domar**, the westernmost of the Anamba islands, is a barren rock, with its summit\* elevated 270 feet above high water, and with depths of from 30 to 32 fathoms close around. There is a small indentation both on its north-east and south-west sides where landing can be effected in fine weather. There is a little scanty vegetation near the top of the islet.

The bold cliffs show white from the guano deposited on them.

Lat. 2° 18' N.  
Long. 105° 38' E.

**White rock**, the south-westernmost of the group, is a white, flat-topped barren rock, 110 feet high, and three-quarters of a cable in length, with steep cliffs at its eastern end. It is steep-to all round, except close to the western extremity, where the shallow water extends off for a short distance.

**Pulo Repon**, situated 17 miles E. by N.  $\frac{1}{4}$  N. of White rock, is 685 feet high, wooded, and about half a mile in extent. It has two peaks joined by a high saddle, the eastern summit being the higher, and is surrounded by a narrow fringe of reef, the edge of which is steep.

General chart, 2,680a [2,878].

**Pulo Baua** is a group of uninhabited islets and rocks extending  $1\frac{1}{2}$  miles in a north and south direction, the whole being surrounded by a reef and lying 13 miles north-east from Pulo Repon. The largest and northern islet has a wooded summit 440 feet high, and close to the northward of it there is a pyramidal-shaped rock, 220 feet in height.

Chart, 1,371  
[2,579].  
Lat.  $2^{\circ} 31' N.$   
Long.  $106^{\circ} 3' E.$   
Var.  $2^{\circ}$  E.

The southern islet is 410 feet high. The edge of its reef extends south-eastward to a distance of 3 cables. Between the two principal islets there are a few low bushy islets and rocks standing on the edge of the reef connecting them ; the group rises from depths of 35 to 45 fathoms.

**Pulo Rittan** is another small uninhabited group of three islands, extending  $2\frac{1}{2}$  miles in a north-east and south-west direction, situated  $14\frac{1}{2}$  miles N.E. by E.  $\frac{3}{4}$  E. from Pulo Baua.

The southern island is one mile in length, 450 feet high near the southern end, and thickly wooded, with an islet close eastward of its northern extreme. Both stand on the same fringing reef which projects on the eastern and southern sides to a distance of 2 cables.

Separated from these islands by a channel one mile wide, is the north-eastern islet of the group on a reef that extends to the north-eastward and westward for 4 cables ; a flat rock, about 30 feet high, marks the western extremity of the reef.

The channel between the islets appeared to be clear, but it was not examined in any detail.

**Tide-rips.**—Southward of Pulo Rittan tide-rips and overfalls were observed with all the appearance of shoal water, but examination merely showed a slightly uneven bottom, and nothing suspicious could be detected by the lead.

**Brownrigg rock**, with 12 feet water, is a coral patch lying Lat.  $2^{\circ} 38' N.$   
Long.  $106^{\circ} 19' E.$   
 $9\frac{1}{2}$  cables E. by N. from the northern point of the north-eastern islet of the Pulo Rittan group. There are generally tide-rips over the patch.

**Pulo Riabu.**—The Riabu group extends from 5 to 12 miles north-north-westward from the Rittan group. The principal island, Pulo Riabu, is 6 miles in length, with an average breadth of  $1\frac{1}{2}$  miles.

A high wooded ridge, with several prominent peaks on it, traverses the island. The highest peak, near the north-western end, is 1,595 feet in height, showing sharp from all directions.

The other prominent peak 1,580 feet high, is near the centre of the island and is flat-topped.

The eastern coast has several small deep-water bays ; on the west coast there is a bay over one mile in extent, in the centre of which there is anchorage in a depth of 12 to 15 fathoms, mud ; the head of the bay is foul.

Charts, 1,871  
[2,679].  
2,244 [2,580].  
Var. 2° E.

A reef extends half a mile in a north-westerly direction from the southern point of this bay and has an islet on it.

South-eastward of Pulo Riabu, and separated from it by a boat-channel, is an island having a sharp wooded summit, 610 feet high. The only natives that were seen in the Riabu group inhabit a village on the northern coast of this island.

Extending  $1\frac{1}{4}$  miles eastward and north-eastward of the above-mentioned island, there is a group of six small islets 180 to 220 feet in height; the passages between them should not be attempted. A coral patch of 3 fathoms lies one mile W.  $\frac{3}{4}$  N. from the northernmost of these islets. A reef awash, lies one quarter of a mile from the north point of the bay in Pulo Riabu, north-westward of the islets.

The flat white rock, 45 feet high, situated three-quarters of a mile S. by W. from the south-eastern islet of the Riabu group, has a patch of foul ground a quarter of a mile to the northward of it, and a reef awash at half a mile W.S.W. from it.

**Pulo Piling**, 1,065 feet high and densely wooded, with a sharp and prominent summit, lies to the westward of Pulo Riabu, and is separated from it by a channel nearly three-quarters of a mile wide.

A reef awash lies 4 cables from the centre of the north coast.

Lat. 2° 47' N.  
Long. 106° 10' E.

**Pulo Sra**, a wooded islet, half a mile in extent and 405 feet high, lies about  $10\frac{1}{2}$  miles westward of the north end of Pulo Riabu. It is surrounded by a narrow fringe of reef which is steep close to its edge, except on the north and south-east sides, where shallow water extends off about one cable.

**Tokong**, a small islet, steep-to all round, 100 feet high and covered with trees, lies 2 miles north-north-westward from Pulo Riabu.

Lat. 2° 49' N.  
Long. 106° 10' E.

**Meander rock**, about 3 cables in extent with depths of one to 2 fathoms, on which the sea occasionally breaks, surrounded by depths of 20 to 24 fathoms, lies with Tokong bearing N.N.E.  $\frac{1}{4}$  E., distant  $1\frac{1}{4}$  miles.

**Pulo Genting**, a wooded islet, 315 feet in height, lying  $4\frac{3}{4}$  miles W. by N.  $\frac{3}{4}$  N. from the north point of Pulo Riabu, is half a mile in length, with two rounded peaks on its eastern part. The north-west end of the islet is low, with a reef extending from it to the distance of 3 cables.

**Pulo Mantanio**, a wooded islet, half a mile in extent, and 325 feet high, lies  $1\frac{1}{2}$  miles north-west of Pulo Genting.

A reef extends eastward from it for half a mile, with a rock 6 feet in height near its northern edge.

**PULO TEMIAN and Pulo Pentebawa**, forming, with other islets and rocks, a group  $3\frac{1}{2}$  miles in length, lie  $3\frac{1}{2}$  miles north-

eastward from Pulo Mantanio. The first-named island is  $2\frac{1}{4}$  miles in length, with a breadth of over half a mile. It is low in the centre, rising to a broad-topped flat hill at either end; the westernmost and the higher being 860 feet in height and densely wooded. There are inhabitants on the north-east side of the island.

Pulo Pentebawa is a flat islet 100 feet high, lying three-quarters of a mile south-east from Temian, and stands on a reef that projects south-eastward 4 cables from it, on the extremity of which is a small button-shaped islet, 85 feet high.

There is a small detached reef one-third of a mile S.S.W.  $\frac{1}{4}$  W. from the small 85-feet islet.

A flat island, 130 feet in height, similar in appearance to Pentebawa, lies half a mile S.W. from that islet. At one mile westward of this flat island is another islet 145 feet high, with a tongue of reef projecting 2 cables westward of it.

The channel between Pulo Mantanio and the Temian group has depths of 26 to 34 fathoms, and is clear of danger.

**PULO TAMBIN** and **Pulo Ujong**,\* situated about 2 miles north-eastward of Pulo Temian, lie half a mile apart with a narrow channel between; they are each about one mile in extent, 525 and 505 feet high, respectively, and wooded. Both islands are inhabited. The channel between them and Temian is quite clear, with depths of 34 to 37 fathoms. Reef extends from the southern and northern points of Ujong to a distance of about 3 cables.

Lat.  $2^{\circ} 57' N.$   
Long.  $106^{\circ} 11' E.$

**Pulo Teliban**, nearly 2 miles in length, by two-thirds of a mile in breadth, is wooded; its summit, 610 feet high, is near the northern end. It is separated from Pulo Tambin by a channel one mile wide.

**Pulo Dekar**, an islet half a mile in extent, and 350 feet high, lies half a mile westward of Teliban. It stands on an irregular-shaped reef which extends 4 cables westward and nearly one mile northward, in patches, leaving a boat channel between it and Teliban. On the western side of this reef there are detached patches of reef.

A coral patch of 5 fathoms lies three-quarters of a mile N.W.  $\frac{1}{4}$  W., and another patch, of 3 fathoms,  $1\frac{1}{10}$  miles N. by E. from Pulo Dekar.

**PULO BUAN**, a wooded islet 250 feet high, and one mile in length, lies  $3\frac{1}{2}$  miles north-east from Pulo Ujong.

A reef extends 4 cables southward of the islet, with a rock on it 14 feet high.

**Pascoe rock** has a depth of 3 fathoms, with 28 to 30 fathoms all around. It lies 2 miles E. by N. from the north point of Pulo Buan.

Lat.  $3^{\circ} 04' N.$   
Long.  $106^{\circ} 17' E.$

**Pulo Telinjan** is a wooded islet half a mile in length, and 285 feet high. It lies  $2\frac{1}{2}$  miles north-westward from Pulo Buan.

Charts, 1,371  
[2,579],  
2,344 [3,580].  
Var. 2° E.

**Bennet rock**, with a depth of 2 fathoms, lies  $8\frac{1}{2}$  cables E.  $\frac{1}{4}$  S. from the south point of Pulo Telinjan. There is a patch of 5 fathoms (or probably less water) N.E. by E.  $\frac{1}{2}$  E. distant  $1\frac{1}{3}$  miles from the same point, and another with 7 fathoms lying W.S.W., distant three-quarters of a mile from it.

**Genting Uniot** is the westernmost and largest island of a group of six, situated from 6 to 9 miles north-westward of Pulo Telinjan. It is 2 miles in length, with a bay penetrating half a mile on its west side, in the centre of which there is a depth of 15 fathoms.

A ridge of wooded hills runs throughout the island, culminating in a summit 950 feet high, near the southern end.\* The coasts of the island have but little reef round them, except at the northern extremity, off which it extends, nearly one-third of a mile, with a rock about 5 feet high near its outer end.

**Pulo Semessa**, a wooded islet, 450 feet high, lies between Genting Uniot and Pulo Lingai, and is connected with the latter by a reef.

**Pulo Lingai** is  $1\frac{1}{2}$  miles in length, and pear-shaped. A ridge of wooded hills rises to a summit 950 feet high towards the southern end.

**Pulo Moso**, an islet half a mile in extent, and 395 feet high, lies close southward of Pulo Lingai and is connected with it by a reef.

**Pulo Nauan**, a wooded islet, 270 feet in height, is the eastern islet of the group. Shallow water extends westward from this islet nearly half way to Pulo Lingai.

**Batu Karang Sinki** is a dangerous sand and coral patch, three-quarters of a mile in length, in a north and south direction, with a rock awash near its centre, and depths of 2 to 3 fathoms over other parts. From the rock awash, the eastern extreme of Pulo Nauan bears S. by W., distant  $1\frac{1}{2}$  miles.

**Barnes patch**, of sand and coral, with a depth of 7 fathoms, is situated 2 miles S. by E.  $\frac{3}{4}$  E. from the eastern extreme of Pulo Nauan. It forms the north-west end of a bank with general depths of 17 to 19 fathoms, extending north-westward almost continuously from Pulo Telinjan. There is a patch of 10 fathoms, three-quarters of a mile S.E. from Barnes patch on the same bank.

\*Lat. 3° 4' N.  
Long. 105° 59' E.

**PULO TELAGA** is the principal island of a group 5 miles in length, lying nearly midway between Jimaya and Genting Uniot. Pulo Telaga is the easternmost island, and is 4 miles in length, by about a mile in breadth. A conspicuous conical peak, 1,740 feet in height,\* is situated near the northern end, and a high ridge of hills runs the whole length of the island, which is densely wooded. Foul ground extends one-third of a mile from its southern points. The island is inhabited, the villages being principally on the western side.

**Pulo Lima**, the northern island of the Telaga group, is 475 feet in height; Pulo Midai lies between it and Telaga. Pulo Passu, 250 feet high, lies close northward of Midai, and is joined to it by a sandy neck dry at low water. Between Pulo Midai and Telaga there is a passage with depths of from 13 to 17 fathoms.

**Telaga Kechil**, close southward of Pulo Lima has a sharp summit 585 feet in height.

**Pulo Buton**, a narrow inhabited islet, cultivated with cocoanut trees, is  $1\frac{1}{2}$  miles in length, and lies two-thirds of a mile westward of the southern part of Telaga. A reef extends off the northern point for two-thirds of a mile, with a rock on it. Midway between this reef and the reef extending southward from Telaga Kechil there is a reef half a mile in extent, having a passage to the southward of it a quarter of a mile wide leading to an indifferent anchorage in 17 to 18 fathoms water westward of Telaga. This anchorage was not closely examined, but appears to be clear of danger. There is another channel leading to this anchorage from the southward between Pulo Buton and Telaga, but in view of the small scale on which the survey was done, it is not prudent to attempt the narrow channels between the islets of a group.

**Tokong Blinao** is a rock 6 feet high, with foul ground extending to the north, east, and south of it to a distance of nearly half a mile; it lies with the west extreme of Pulo Lima bearing N.E. by E.  $\frac{1}{4}$  E., distant 3 miles.

**JIMAYA ISLAND** is the principal and by far the largest island of the western group. It is 15 miles in length, 8 miles in extreme breadth, but of irregular shape, and in two places is little more than one mile across. It is densely wooded and mountainous, attaining a height of 1,530 feet; the peaks on the northern part of the island are for the most part easily distinguishable, but towards the southern end they become more uniform in outline.

There are several large villages on the coast, principally on the northern part of the island. The north point has a reef extending 4 cables off, on which are several rocks above water.

**West Coast.—Julan point.—Pulo Ipan**, an islet 80 feet in height, cultivated with cocoanut trees, lies a quarter of a mile westward from Julan point on the north-west coast of Jimaya, and is steep-to. The coast northward is fringed with reef, but has no off-lying dangers.

**Courier patch**, with a depth of 6 fathoms, lies S.W. distant  $1\frac{1}{2}$  miles from Julan point, with depths of 16 to 20 fathoms around.

It is stated that in 1839 the *Courier* struck on a rock about 3 miles S.W.  $\frac{1}{2}$  S. from Julan point. The ground in this vicinity was carefully

Chart, 1,371  
[2,579].  
Var. 2° E.

searched by the boats of H.M.S. *Egeria* during three days, but with the exception of the 6-fathoms patch above mentioned, no other shoal could be detected, and nothing less than that depth was obtained.

**Pulo Sibrong** is a wooded island,  $1\frac{1}{2}$  miles in length, with two prominent peaks, the southern one being 580 feet in height. The bay within is too much encumbered with reef for a vessel to enter. There is a village at the head of this bay.

**Pulo Tulai**, 365 feet high, lies between Julian point and Pulo Sibrong, but a reef extends 2 cables from its southern half.

**Anchorage.**—There is anchorage in a depth of 8 fathoms, sand, at a quarter of a mile north-eastward of Pulo Tulai, but it is not advisable to go further into the bay.

**Gunong Datu** and **Gunong Adong**, 1,480 feet and 1,420 feet high, respectively, are two prominent peaks on the north part of the island. The former shows as a remarkably sharp peak from nearly all views, the latter shows as a rounded hill from the eastward or westward, but is sharp from the northward.

**Pulo Daru**, a wooded island 635 feet high, lies close to Jimaya. A small islet, Pulo Katukan, lies a quarter of a mile to the westward of it, with a narrow boat channel between.

**Margesson shoal**, of sand and coral, is about  $1\frac{1}{2}$  miles in length, and consists of two portions; the northern one has a least depth of 7 fathoms, and the southern a depth of 5 fathoms.\* From the latter, Jibang point, bears E. by S.  $\frac{5}{8}$  S., distant  $7\frac{1}{2}$  miles. This shoal has depths of 22 to 28 fathoms around, and is usually marked by tide-rips.

\*Lat. 2° 51' N.  
Long. 105° 36' E.

**Jibang point** is the southern extreme of Jimaya island; the hills slope gradually down to the point; a flat rock, 20 feet high, lies about 3 cables south-east of it.

Lat. 2° 51' N.  
Long. 105° 47' E

**East Coast.—Telok Neratu** is a large bay, the entrance of which is  $3\frac{1}{2}$  miles across between Pulo Dayong and Tanjung Linang. The southern portion of this bay is an inlet about 3 miles in length, but is so encumbered with reefs that a vessel cannot make use of it. In the northern portion of the bay is Pulo Ponissan, 400 feet high; the space within it is blocked with reefs. A detached reef lies two-thirds of a mile southward of Pulo Ponissan, and within this also reefs encumber the bay.

A patch of 2 fathoms, lies three-quarters of a mile north of Pulo Dayong, and this marks the western limit to which a vessel may safely enter the southern portion of Telok Neratu.

**Anchorage.**—There is anchorage in a depth of 14 fathoms, mud, midway between Pulo Ponissan and Pulo Dayong, with the north end of the latter bearing S.W. by S., distant one mile.

General chart, 2,660a [2,678].

**Telok Kwala**, situated close northward of Tanjong Linang, is a narrow inlet 2 miles in length. A rocky bar, with a depth of 3 fathoms, stretches right across, three-quarters of a mile within the entrance. Within this bar there are depths of 6 fathoms gradually shoaling towards the head of the inlet, with two detached coral patches obstructing it. The large village Kampong Kwala lies near the head of the inlet on the northern shore; it is the principal village of the island and much frequented by the sailing schooners collecting produce.

**Anchorages.**—There is anchorage off the entrance, northward of Tanjong Linang, in a depth of 12 to 14 fathoms, sand.

In the bay northward of Telok Kwala there is anchorage anywhere near the centre in 9 to 10 fathoms, sand, about three-quarters of a mile from the shore, which is fringed with reef extending from one cable to half a mile in places.

**Gunong Tujoh**, densely wooded, double peaked, and 1,530 feet in height, is the highest and most prominent mountain in the island, and is conspicuous from every direction.

**Tanjong Penanang**, the north-eastern extreme of Jimaya island, is low, and lies 2 miles northward of the north point of the bay before mentioned. Off the coast between there is an islet cultivated with cocoanut trees, close to the southward of which there is a detached reef, which projects beyond the line of the points.

**Pulo Penanang**, situated  $1\frac{1}{2}$  miles N.W. by N. from the point of the same name, is 270 feet high, and planted with cocoanut trees.

**Pulo Ayam**, with two peaks each 500 feet in height, lies  $2\frac{1}{4}$  miles westward of Tanjung Penanang, close to the coast of Jimaya island, and is connected with it by a reef.

**Telok Mampoh** is a large bay on the north coast of Jimaya. It is  $4\frac{1}{2}$  miles wide between Pulo Ayam and Tanjung Mingar, and  $3\frac{1}{2}$  miles deep to its head, where there is a long stretch of sandy beach and several villages. The general depths in this bay are 16 to 18 fathoms over a sand and gravel bottom in the outer part, gradually shoaling to 7 and 8 fathoms at one mile from the sandy beach at the head. There is a conspicuous hill, Gunong Silvassi, 840 feet high, close to the coast at the eastern end of the sandy beach, and another conspicuous hill, Gunong Puding, 700 feet high, at the head of the bay near the western end of the beach.

**Reefs.—Anchorage.**—The western shore of Telok Mampoh is foul within a mile of the coast, and there is a coral patch of 3 fathoms, with Gunong Silvassi bearing S.E.  $\frac{1}{4}$  S., distant a little over one mile. At the head of the bay also there are detached patches of reef within half a mile of the beach; with these exceptions the bay appears to be clear of

Chart. 1,371  
[2,579].  
Var. 2° E.

dangers, and suitable for anchorage in any part at a convenient distance from the shore.

**Pulo Gumbong and Pulo Udan** are two islets on the same reef in the northern part of Telok Mamphoh, lying close together, of which the eastern one, Pulo Gumbong, 320 feet in height, is the higher.

Lat. 3° 3' N.  
Long. 105° 44' E.

**Tanjong Mingar.**—The north point of Telok Mamphoh is a promontory 350 feet high, and appears from a distance as an island, being joined to the mainland by a low sandy neck.

**Anchorage.**—Westward of Tanjong Mingar the coast forms a bay  $1\frac{1}{2}$  miles deep and three-quarters of a mile wide, affording convenient anchorage in a depth of 16 fathoms, sand, with Tanjong Mingar bearing East, distant one mile, out of the influence of the tidal streams which set somewhat strongly through Impul passage. There is a patch of 4 fathoms half a mile westward from Tanjong Mingar.

The head of the bay is foul, and also the western side where there are some detached coral patches extending a quarter of a mile from the shore. The edge of the reef on the eastern side is, however, steep, and by keeping over on that side, the bay may be entered to within three-quarters of a mile of its head, where there is from 12 to 13 fathoms water.

**PULO IMPUL** is the highest and easternmost of a group of islands extending 9 miles in an east and west direction, at one mile northward of Jimaya. It is  $2\frac{1}{2}$  miles in length, with an extreme breadth of  $1\frac{1}{2}$  miles. The sharp and conspicuous wooded summit lies near its centre, and is 1,180 feet in height. In the bay, on the south-east side of the island, is an islet 130 feet high, surrounded by reef, and about 2 cables southward of the islet there is a reef of rocks just awash at high water.

**Impul passage**, between Pulo Impul and Jimaya, is one mile wide in its narrowest part and clear of dangers; the shores on either side are steep. The flood stream sets to the westward, and the ebb to the eastward at about  $1\frac{1}{2}$  knots at springs.

Lat. 3° 4' N.  
Long. 106° 40' E.

**McCaulay patch** is a small coral patch of 5 fathoms, and possibly less water, with 20 to 27 fathoms around, in the western approach to Impul passage. It lies  $1\frac{1}{2}$  miles W.  $\frac{3}{4}$  N. from the end of the low black rocks off the north point of Jimaya island.

**Clearing marks.**—Telaga summit in line with the south extreme of Pulo Impul, N. 89° E. leads  $2\frac{1}{2}$  cables northward of McCaulay patch. The south-east extreme of Pulo Impul in line with the end of the black rocks off Jimaya, E.N.E., leads 7 cables southward of McCaulay patch, and Pulo Ipan in line with Pulo Katukan, S.  $\frac{1}{4}$  E., leads eastward of the patch.

**Bunker patch** is a coral head of 5 fathoms, on a small 10-fathoms bank situated  $1\frac{3}{8}$  miles N. by E.  $\frac{1}{4}$  E. from Tanjung Mingar. The whole  $\frac{2,579}{3,244}$  [3,580].  
of Pulo Manki kept open southward of Pulo Impul, leads southward of  
Bunker patch.

**Pulo Ania**, 640 feet high, north-west of Pulo Impul, is separated from it by a channel 2 cables broad with depths of 7 fathoms. Two islets, 180 feet and 205 feet high, lie, respectively, half a mile north-west and north from Pulo Ania ; the western is fringed by reef.

**Pulo Moburi** is separated from Pulo Ania by a channel half a mile wide. The island is  $2\frac{1}{2}$  miles in length, and joined by a mangrove swamp (through which there is a canoe passage) to Pulo Kramat on its south-west side. A ridge of rounded hills lies on the north side of Pulo Moburi, the highest of which is 810 feet in height. The bay on the southern coast of Pulo Moburi is encumbered with foul ground and does not afford convenient anchorage.

Pulo Datu is 350 feet high, and lies close to the south-east extreme of Pulo Moburi.

**Pulo Manki**, the westernmost island of the group, lies 2 miles from Pulo Kramat, with a deep and clear passage between. It is  $1\frac{1}{2}$  miles in length by half a mile in breadth, 575 feet high and wooded, and almost of an uniform height throughout.

Manki Kechil, 200 feet in height, lies close southward of the east point of Pulo Manki. The coasts of Pulo Manki and Manki Kechil are fairly steep-to.

**DURAI** is a wooded uninhabited island half a mile in extent, with two sharp peaks 500 feet high, and lies N. by E. distant 15 miles from Telaga. Half a mile westward of the island is Batu Mamong, a rock 4 feet high. There are depths of 30 to 40 fathoms around the island.

**Tokong Nannas** is a bare rock 70 feet high, situated  $5\frac{1}{2}$  miles W.  $\frac{1}{2}$  S. from Durai. A narrow bank of 6 fathoms, coral, steep-to, extends for nearly a mile W.S.W. from the rock.

**The NORTH-EASTERN GROUP** of the Anamba islands situated between the parallels of  $2^{\circ} 58'$  N. and  $3^{\circ} 30'$  N., consists of three large islands with numerous small islands and islets to the east and south-eastward of them.

**Pahat**, the north-westernmost islet of the group, is pear-shaped. Its flat wooded summit, 700 feet high, lies at the northern end. Reef projects from the south-east side about a quarter of a mile. It is surrounded by depths of 36 fathoms within half a mile all round.

Charts. 1,371  
[2,579].  
2,144 [2,680].  
Var. 2° E.

**MOBUR ISLAND**, the north-westernmost of the three large islands of the group, is nearly 6 miles in length, and varies in breadth from half a mile to 3½ miles. The summit, 1,330 feet high and densely wooded, is situated in the south-east part of the island. Viewed from the northward or southward it appears as a fairly sharp peak, but from the westward it presents an uniform outline. Noran, a small islet 160 feet high, lies close off the north point of the island.

The north-western coast of Mobur is fringed with reef to about 1½ cables, with no off-lying danger.

Lat. 3° 21' N.  
Long. 106° 10' E.

**Pajantai** is a small level-topped island 215 feet high, lying three-quarters of a mile off the west coast of Mobur. Shallow water extends about one cable from the island except off the southern point which is steep-to.

**Regni**, another wooded islet with black cliffs on its south side, lies near the south-west side of Mobur island.

**Pulo Manga** is a wooded island 520 feet high, and 1½ miles in length, on the south side of Mobur. At its north-west end it is only separated from that island by an opening a few yards broad.

**Telok Ayer Bandong** is a deep narrow inlet between Pulo Manga and the south-east point of Mobur. It is about 2 miles in length, 3 cables in breadth, and has general depths of 21 to 17 fathoms, mud. The shores of the inlet are fringed with reef, but except at the head, it projects only a short distance. It affords safe anchorage in 17 fathoms at 6 cables from the head. There are a few inhabitants on its shores.

**NIULWAN (or YANG) ISLAND** is 9½ miles in length, by 3½ miles in breadth.

**Telok Niulwan**, on the south-east side of Niulwan, is a shallow inlet 3 miles in length, dividing the southern part of the island into two high and wooded peninsulas, on the coasts of which are many villages. The centre of the island is low. The western peninsula is the higher of the two, the summit, Gunong Niulwan, being 1,365 feet high; it is a prominent peak dominating everything else in the island.

Lat. 3° 19' N.  
Long. 106° 14' E.

**Salat Mata**, separating Mobur and Niulwan islands, is 3½ miles in length, narrowing from three-quarters of a mile at the southern end to a quarter of a mile at the northern end, where it opens out into Telok Mata. It is clear of danger with depths of 13 to 18 fathoms. The shores on either side are fringed with a narrow border of reef, steep-to. The tidal streams set fairly through the channel, flood to southward and ebb to northward from one to 2 knots per hour in the narrow part.

**Pulo Semot** is a wooded island, 710 feet high, lying close northward of Niulwan, from which it is separated by Salat Onass, one cable wide and encumbered with rocks and foul ground.

A patch of 3 fathoms lies with the east extreme of the island bearing S.S.W. distant about half a mile.

Charts, 1,371  
[2,579].  
2,244 [2,580].  
Var. 2° E.

**Telok Mata**, is the bay between the northern portion of Mobur and Niulwan, and is  $2\frac{1}{2}$  miles wide between the entrance points, Pulo Noran and Pulo Semot. There are several islets and rocks on the north-western side of the bay, the principal being Pungailing and Uching, between which the bottom is uneven and rocky; vessels should pass eastward of them.

**Patch.**—At 6 cables N.  $\frac{3}{4}$  W. from Pulo Uching there is a coral bank with 9 fathoms on it, having depths of 30 fathoms around. This patch is out of the fairway to the bay. It is possible there may be less water on it.

Pulo Bahru lies on the eastern side of the bay, a quarter of a mile from the shore; at half a mile southward is a patch of reef outlying the narrow spit of land southward of it.

The general depths in the bay are from 23 to 30 fathoms over a sand and coral bottom; there is no spot that can be particularly recommended as an anchorage.

**Tokong Belayer**, is a conspicuous bare rock like a pillar, 68 feet high, situated about 3 miles northward from Pulo Semot. A reef projects a distance of a quarter of a mile in a northerly direction and one cable southward from it. The edges of the reef are steep.

Lat. 3° 27' N.  
Long. 106° 16' E.

**PULO KELONG**, north-eastward of Niulwan, is  $5\frac{1}{2}$  miles in length, by three-quarters of a mile in breadth, with a ridge of hills from 600 to 770 feet in height, extending nearly the whole length of the island. It is densely wooded and there are several villages along the coast.

The northern extremity, Tanjung Kirpinis, falls steeply from a hill 490 feet high, and is steep-to. On the eastern side, at a quarter of a mile from the shore and two miles to the southward of Tanjung Kirpinis, there is a wooded island 300 feet high, and 6 cables in length, with a narrow channel between it and the shore.

**Hooper patches**, the northern of which is a small sand and coral shoal, has a depth of 5 fathoms at its southern end.\* It lies on the western side of Thetis channel at  $1\frac{1}{4}$  miles E. by N. from Tanjung Muning, south extreme of Pulo Kelong. The southern patch, with a depth of 6 fathoms on it, lies one mile S. by E. from the northern patch.

\*Lat. 3° 19' N.  
Long. 106° 20' E.

**Pulo Mudai**, westward of the centre of Pulo Kelong, is a narrow islet with a conical summit 160 feet high; a reef extends 2 cables northward of it. The islet is situated at the head of the deep bight formed between Pulo Semot and Pulo Kelong. Reefs block the whole of the opening southward of the middle of Mudai.

Charts, 1,371  
[2,579].  
2,244 [2,580].  
Var. 2° E.

\*Lat. 3° 17' N.  
Long. 106° 20' E.

**Anchorage.**—There is anchorage in a depth of 14 fathoms, coral bottom, at one-third of a mile W.  $\frac{1}{2}$  N. from the summit of Pulo Mudai.

**Pulo Piagos, Pidi, Mantong Besar, and Mantong Kechil,\*** form a chain of narrow wooded islets, extending for 2 miles southward of Pulo Kelong; their western sides have considerable reef. There is a narrow passage with a depth of 5 fathoms between Pulo Kelong and Pulo Piagos, the northernmost of these islets.

They are cultivated with cocoanut trees in places and are inhabited.

**Pulo Bilibia,** a wooded island, westward of the above, is 305 feet in height, with a reef extending about 3 cables eastward of it.

**Pulo Lidi,** a narrow wooded island 220 feet in height, lies one mile southward of Pulo Bilibia. A reef projects 6 cables from it towards Mantong Kechil.

**Salat Tobong** is the channel between the Mantong islands and those to the westward, and has depths of 12 to 14 fathoms, mud. Its northern end terminates in a narrow gutter in the reefs between Pulo Kelong and Niulwan.

**Anchorage.**—There is good anchorage in Salat Tobong, nearly three-quarters of a mile westward of Mantong Besar, in 13 fathoms, mud.

Lat. 3° 16' N.  
Long. 106° 20' E.

**Shoal.**—In the southern entrance of Salat Tobong there is a coral shoal with a depth of 7 fathoms, and possibly less water. It lies 6 cables S.  $\frac{1}{4}$  W. from the southern extremity of Mantong Kechil, and foul ground extends for one-third of a mile in a S.S.W. direction from that island. The north-eastern extreme of Niulwan island just open westward of Tanjong Muniug, bearing N. by W., leads westward of the shoal. The western extreme of Tanjong Muning in line with the western extreme of Pulo Ginting, bearing N.  $\frac{1}{2}$  W., leads fairly between the reefs extending on each side from Mantong Besar and Pulo Lidi.

**Pulo Kiladi,** is a narrow wooded island,  $2\frac{1}{2}$  miles in length and 470 feet in height, with its northern end lying 2 cables westward of Pulo Lidi, and on the same reef. Salat Firnenting, a deep gutter in the coral encumbered with patches, separates Kiladi and Telok Pao from the east coast of Niulwan. Pulo Koran, 270 feet high, also lies on the same reef close to the south-eastward. Close eastward of Pulo Kiladi is a chain of islets cultivated with cocoanut trees, the tops of the trees varying from 90 to 115 feet in height.

South and south-eastward of Pulo Telok Pao the reefs are broken up into narrow detached patches, through which a boat can with difficulty find a passage.

**SIANTAN ISLAND,** the southernmost large island, is separated from Niulwan by Salat Pananting. The island is  $10\frac{1}{2}$  miles in length,

General chart, 2,690a [2,678].

with an extreme width of  $5\frac{1}{2}$  miles, and has several bays with high Charts, 1,371  
[2,579].  
2,244 [2,580].  
Var. 2° E. peninsulas between them. It is mountainous throughout and densely wooded. The summit Gunong Sama, 1,855 feet high, situated on the western side, is conspicuous.

A peak 1,595 feet high in the north-east part of the island is conspicuous by its forming a shoulder that falls steeply to the northward. Near the south-east end is Gunong Peta 770 feet high, sharp and conspicuous.

The general outline of the mountain ridges in the broader parts of the island is smooth and rounded, so that the summits are not easy to identify.

**Villages.**—The principal village is Terempa near the north end, and along the coast in the various inlets there are numerous small habitations.

**Tanjong Pedass**, the north-west point of Siantan, is steep-to at Lat. 3° 14' N.  
Long. 106° 12' E. the distance of a cable, and slopes sharply down from a hill 610 feet high, a short distance within it.

**Rock.**—At  $3\frac{1}{2}$  cables E.N.E. from Tanjong Pedass is a small rock, one foot above high water, with 3 fathoms close-to and a depth of 11 fathoms between it and the shore.

At  $1\frac{1}{4}$  miles southward of Tanjong Pedass and half a mile from the coast there is a coral bank of 12 fathoms, having a depth of 18 fathoms within it. Elsewhere the 20-fathoms contour-line maintains a distance of about 2 to 3 cables from the west coast.

**Telok Rambutan** is an inlet on the south-west coast of Siantan, one mile in length by half a mile in width at its entrance, with depths of 8 to 12 fathoms, mud. On the western side, a short distance within the entrance, the reef projects for 2 cables; on the eastern side the reef follows the coast closely.

The inlet is fully exposed to the south and is somewhat confined for anchoring.

**Telok Ayer Bini** lies about 2 miles eastward of Rambutan. Lat. 3° 6' N.  
Long. 106° 15' E. It is about  $1\frac{1}{2}$  miles in length, and nearly one mile in breadth between Tanjong Baik, a low point, and Pulo Soe, a flat-topped wooded island, 300 feet in height, lying near the coast; near its head it is about 2 cables wide.

A small reef lies  $1\frac{1}{2}$  cables off the White rocks, 10 feet high, situated close to the east point of Telok Luing, within Tanjong Baik. There are some houses in this cove.

The reef on the western side extends to a distance of about one cable; on the eastern shore at three-quarters of a mile within Pulo Soe, a detached reef lies parallel with the coast at a distance of  $1\frac{1}{2}$  cables. Abreast the

Charts, 1,371  
[2,579].  
2,244 [2,580],  
Var. 2° E.

northern end of this detached reef, at the distance of  $2\frac{1}{2}$  cables from the west shore, a reef has recently been discovered over which there is a depth of 10 feet; the reef is about 33 yards in length, and is not easy to see until close to.

**Anchorage.**—The depths in the centre of the bay are from 16 to 18 fathoms, mud, affording good anchorage, with the White rocks in line with Tanjong Baik, distant two-thirds of a mile.

Lat. 3° 44' N.  
Long. 106° 16' E.

**Tanjong Katong**, situated 2 miles east-south-eastward from Ayer Bini, is the south-east extreme of Siantan, and has a black flat-topped rock about 20 feet high, close southward. It forms the southern end of a peninsula of which Gunong Peta is the summit.

**Coast.**—To the westward is an inlet  $1\frac{1}{2}$  miles deep open to the south, and therefore exposed during the S.W. monsoon. Reef extends from the coast from one to two cables, increasing to 3 cables at its head. The water shoals from 19 to 12 fathoms, coral bottom, at half a mile from the head.

Lat. 3° 13' N.  
Long. 106° 13' E.

**Siantan, north coast.**—**Terempa cove**, situated on the north coast of Siantan, is three-quarters of a mile wide between its entrance points, and nearly one mile in length to its head, where there is a sandy beach on which the village of Terempa stands. The coast on either side is fringed by reef to about  $1\frac{1}{2}$  cables, except near the village.

**Village.**—**Terempa** is the principal village in the group and contains the residence of the Dutch Government official. Very good drinking-water can be obtained here from a spring.

**Anchorage.**—There is anchorage in a depth of 16 fathoms, sand and mud, at one-third of a mile from the head of the cove, where there are usually some sailing schooners at anchor.

**Coast.**—From the peninsula forming the east side of approach to Tereimpa, the coast fronted by reefs trends south-eastward for 2 miles to Tanjong Kangor, with a small bay between, and thence for  $2\frac{1}{2}$  miles to Pulo Jankat, a wooded islet, 105 feet in height, lying close off the coast.

**Telok Bara.**—Half a mile to the southward of Pulo Jankat is the entrance to a narrow channel leading through the fringing reef to Telok Bara. On the west side of the cove there are two waterfalls close to each other.

Lat. 3° 14' N.  
Long. 106° 18' E.

**Salat Pananting**, separating Siantan from Niulwan, is a channel from three-quarters to  $1\frac{1}{2}$  miles wide, with depths of 10 to 24 fathoms. The western portion of this channel is deep and clear, but eastward of Tanjong Kangor it becomes much obstructed by reefs. The fringing reef off Tanjong Kangor projects 3 cables from the shore, and its edge is irregular and broken up. Off the south-eastern extreme of Niulwan, reef and foul ground extends nearly across the strait, leaving only a navigable channel 2 cables wide on the Siantan side.

General chart, 2,698a [2,678].

**Batu Birla** and **Misabong**, 385 and 435 feet in height, respectively, lie about half a mile off the north-east side of Siantan, on the reefs which block the eastern entrance of Salat Penanting. Several smaller islets stand on the same reefs.

Charts, 1,371  
[2,574].  
2,244 [2,580].  
Var. 2° E.

**Siantan island, east coast.**—From Telok Bara the coast southward for 6 miles to Tanjung Katong, the southern point of the island, has numerous small villages at intervals.

**Pulo Bajau** or **Pulo Nyamok**, lies eastward of Siantan with Salat Simangi between. It is an island about 5 miles in length, of very irregular shape, indented on the north, south, and east sides by deep bays; the western portion is known as Pulo Bajau, and the eastern or larger portion as Nyamok. There are two prominent peaks; the western one, Gunong Simangi, 785 feet in height, the other peak, 780 feet high, lies one mile north-eastward of it. There are inhabitants along the shores of nearly all the inlets, and in several parts of the island cocoanuts are cultivated.

**Salat Batu Birla** is a strait 2 miles in length, separating Pulo Batu Birla and Pulo Misabong from Siantan. It has depths of 11 to 12 fathoms, but is only two cables wide between the edges of the reefs. There is a detached patch of reef about a cable off the reef extending south-eastward of Jankat, on the west side of the northern entrance. There are no leading marks for this strait, and the tidal streams run somewhat strongly, flood to the southward and ebb to the northward.

Lat. 3° 11' N.  
Long. 106° 17' E.

**Directions.**—Neither Salat Penanting nor Salat Batu Birla are channels that can be recommended, but in case of necessity the following directions may be useful concerning their navigation:—

Entering Salat Pananting from the westward, keep in mid-channel; before coming abreast of Tanjung Kangor, bring the western extreme of Niulwan in line with another black cliffy point south-eastward of it, bearing N. 43° W. Keep these marks on, astern, until the northern extreme of Pulo Bata Birla bears S. 82° E. in line with the north extreme of Pulo Luyong, and steer for it on that bearing till the western extremes of Pulo Batu Birla and Pulo Misabong are in line bearing S. 22° E. Then alter course for those points, keeping them in line until abreast of a small detached patch of reef which will be passed close to on the starboard hand when Pulo Jankat is abeam, when course must be altered to clear the reef extending from Pulo Batu Birla. Thence, keep in the fairway of the channel between the reefs, and when to the southward of Pulo Misabong either steer north-eastward through Salat Jalan or south-westward into Salat Simangi.

**Salat Jalan** separates the north-west part of Pulo Bajau from Pulo Misabong and leads to Salat Simangi and Salat Batu Birla from the

General chart, 2,600a [2,678].

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Charts, 1,371  
[2,570].  
2,244 [2,580].  
Var. 2° E.

eastward. It is a quarter of a mile wide between the edges of the reefs with depths of 10 to 20 fathoms.

The tidal streams set through with some strength, flood to the south-west and ebb to the north-eastward.

Lat. 3° 9' N.  
Long. 106° 18' E.

**Salat Simangi**, separating the west coast of Pulo Bajau from Siantan, varies in width from  $3\frac{1}{2}$  to 2 cables between the edges of the reefs. The depths are 12 to 15 fathoms, but there is a sand and coral patch of  $5\frac{1}{2}$  fathoms in the centre of the strait. The edges of the reefs project on the Siantan side from  $1\frac{1}{2}$  to  $3\frac{1}{2}$  cables, and there are detached patches on that side also; on the other side the reef follows the shore more closely.

**Salat Barawa** is the continuation of Salat Simangi in a south-south-east direction and its southern entrance; the channel is reduced to little more than one cable in width between the fringing reefs within its entrance, opening southward into a deep bay formed between Tanjung Katong and Tanjung Suka on the east side.

**Anchorage.**—There is anchorage in 15 fathoms, sand, in the bay off the entrance to Salat Barawa. The head of the bay on the south side of Pulo Bajau is encumbered with reef. Pulo Berala, 140 feet in height, and covered with cocoanut trees, lies half a mile off Tanjung Katong, west side of approach to the bay.

**Pungelat**, Oro-oro, Batu Itam, Pirmotos and Pulo Tungeran, constitute a chain of inhabited islets from 135 to 260 feet in height, extending in a south-west and opposite direction for  $3\frac{1}{2}$  miles, and situated south-eastward of Pulo Nyamok, with Favorite channel between.

Lat. 3° 6' N.  
Long. 106° 26' E.

**FAVORITE CHANNEL** is two-thirds of a mile wide, reduced in one place, on the western side of the channel near the centre of its length, to about  $4\frac{1}{2}$  cables by a patch of reef that dries 3 feet, and generally shows clearly; there is another patch near the same shore at three-quarters of a mile north-west of it. There are depths of 22 to 24 fathoms in this channel, which is straight and clear of danger with the exception of the reefs alluded to. The tidal streams set straight through, flood to the south-westward and ebb to the north-eastward from  $1\frac{1}{2}$  to 2 knots per hour. On the flood, with a southerly wind, there are tide-rips and overfalls in the southern part of the strait.

**Clearing marks.**—The west side of Pulo Gueta, in line or just open of the north-western entrance point of Favorite channel, bearing N. 29° E., leads eastward of the reefs in the channel.

**Anchorage.**—There is anchorage on the north-west side of Pungelat in 17 to 18 fathoms, sand, at  $1\frac{1}{2}$  cables from the island, with Gunong

Munjan (the summit of Pulo Tanapuniat) in line with the south-east point of Oro-oro, bearing S.  $2^{\circ}$  W. Charts, 1,371  
[2,579],  
2,244 [2,580].  
Var.  $2^{\circ}$  E.

**PULO TANAPUNIAT** is an island  $2\frac{3}{4}$  miles in length.

Gunong Munjan, its summit,\* is 760 feet in height, and is conspicuous from all views. Pulo Abong, 345 feet in height, lies close westward of its southern end. \*Lat.  $3^{\circ} 4'$  N.  
Long.  $106^{\circ} 21'$  E.

The channel westward of Pulo Tanapuniat separating it from the chain of islets mentioned above, is one mile wide between Pulo Tungeran and Pulo Abong, narrowing to a little over one cable in width near Batu Itam; it is not recommended as a ship channel. There are inhabitants on both sides of it.

**Walsh patch**, of coral with a depth of 6 fathoms, lies  $2\frac{1}{4}$  miles S.W. by W.  $\frac{1}{4}$  W. from Pulo Abong, with depths of 20 to 27 fathoms around.

For Pascoe rock situated 2 miles to the southward, see page 69.

**Batu Rakit** consists of rocks from 2 to 6 feet high, situated at a quarter of a mile off the centre of the east coast of Tanapuniat.

**AKAR, BOITEU, &c.**, form a group of six islands and islets extending from one to 4 miles south-eastward of Tanapuniat. Akar island,  $1\frac{1}{2}$  miles in extent and 525 feet in height, the largest and easternmost of the group, is uninhabited and densely wooded. Boiteu and Baba stand on the same reef, with another island lying between them and Akar. The westernmost islet of the group has a sharp summit 240 feet in height.

**Howard rock**, with 13 feet water, lies three-quarters of a mile E. by S.  $\frac{3}{4}$  S. from the north point of Pulo Tanapuniat, and nearly 2 miles northward of Batu Bini.

**Clearing marks.**—The south-west extreme of Mankian Pandok, in line with the south-west extreme of Pulo Gueta, N. by W.  $\frac{3}{4}$  W., leads three-quarters of a mile eastward of Howard rock, and leads also just eastward of the eastern Chabrol patch.

**Batu Laki** is a rock 3 feet high lying midway between the above-mentioned group of islands and Pulo Tanapuniat, at  $8\frac{3}{4}$  cables E.  $\frac{1}{4}$  N. from Tanjung Baluntao, and is steep-to.

**Batu Bini** is a rock that dries 3 feet, situated 4 cables N.  $\frac{1}{4}$  W. from Batu Laki.

**Egeria rock**, a coral head of 2 fathoms with 20 to 30 fathoms at a short distance, lies  $1\frac{6}{10}$  miles S.  $80^{\circ}$  E. from the north-east extreme of Akar island. Half a mile W.  $\frac{3}{4}$  S. from Egeria rock is a patch of  $3\frac{1}{2}$  fathoms with deep water between. Lat.  $3^{\circ} 2'$  N.  
Long.  $106^{\circ} 27'$  E.

**Nonsense**, about one mile southward of Akar, is the south-easternmost island of the northern group of the Anambas. It is a narrow wooded

Charts, 1,371  
[2,579].  
2,244 [2,580].  
Var. 2° E.

eastward. It is a quarter of a mile wide between the edges of the reefs with depths of 10 to 20 fathoms.

The tidal streams set through with some strength, flood to the south-west and ebb to the north-eastward.

Lat. 3° 9' N.  
Long. 106° 18' E.

**Salat Simangi**, separating the west coast of Pulo Bajau from Siantan, varies in width from  $3\frac{1}{2}$  to 2 cables between the edges of the reefs. The depths are 12 to 15 fathoms, but there is a sand and coral patch of  $5\frac{1}{2}$  fathoms in the centre of the strait. The edges of the reefs project on the Siantan side from  $1\frac{1}{2}$  to  $3\frac{1}{2}$  cables, and there are detached patches on that side also; on the other side the reef follows the shore more closely.

**Salat Barawa** is the continuation of Salat Simangi in a south-south-east direction and its southern entrance; the channel is reduced to little more than one cable in width between the fringing reefs within its entrance, opening southward into a deep bay formed between Tanjong Katong and Tanjung Suka on the east side.

**Anchorage.**—There is anchorage in 15 fathoms, sand, in the bay off the entrance to Salat Barawa. The head of the bay on the south side of Pulo Bajau is encumbered with reef. Pulo Berala, 140 feet in height, and covered with cocoanut trees, lies half a mile off Tanjung Katong, west side of approach to the bay.

**Pungelat**, Oro-oro, Batu Itam, Pirmotos and Pulo Tungeran, constitute a chain of inhabited islets from 135 to 260 feet in height, extending in a south-west and opposite direction for  $3\frac{1}{2}$  miles, and situated south-eastward of Pulo Nyamok, with Favorite channel between.

Lat. 3° 6' N.  
Long. 106° 26' E.

**FAVORITE CHANNEL** is two-thirds of a mile wide, reduced in one place, on the western side of the channel near the centre of its length, to about  $4\frac{1}{2}$  cables by a patch of reef that dries 3 feet, and generally shows clearly; there is another patch near the same shore at three-quarters of a mile north-west of it. There are depths of 22 to 24 fathoms in this channel, which is straight and clear of danger with the exception of the reefs alluded to. The tidal streams set straight through, flood to the south-westward and ebb to the north-eastward from  $1\frac{1}{2}$  to 2 knots per hour. On the flood, with a southerly wind, there are tide-rips and overfalls in the southern part of the strait.

**Clearing marks.**—The west side of Pulo Gueta, in line or just open of the north-western entrance point of Favorite channel, bearing N. 29° E., leads eastward of the reefs in the channel.

**Anchorage.**—There is anchorage on the north-west side of Pungelat in 17 to 18 fathoms, sand, at  $1\frac{1}{2}$  cables from the island, with Gunong

Munjan (the summit of Pulo Tanapuniat) in line with the south-east point of Oro-oro, bearing S.  $2^{\circ}$  W. Charts, 1,371 [2,579], 2,244 [2,580]. Var.  $2^{\circ}$  E.

**PULO TANAPUNIAT** is an island  $2\frac{3}{4}$  miles in length.

Gunong Munjan, its summit,\* is 760 feet in height, and is conspicuous from all views. Pulo Abong, 345 feet in height, lies close westward of its southern end. \*Lat.  $3^{\circ} 4' N.$  Long.  $106^{\circ} 21' E.$

The channel westward of Pulo Tanapuniat separating it from the chain of islets mentioned above, is one mile wide between Pulo Tungeran and Pulo Abong, narrowing to a little over one cable in width near Batu Itam; it is not recommended as a ship channel. There are inhabitants on both sides of it.

**Walsh patch**, of coral with a depth of 6 fathoms, lies  $2\frac{1}{4}$  miles S.W. by W.  $\frac{3}{4}$  W. from Pulo Abong, with depths of 20 to 27 fathoms around.

For Pascoe rock situated 2 miles to the southward, see page 69.

**Batu Rakit** consists of rocks from 2 to 6 feet high, situated at a quarter of a mile off the centre of the east coast of Tanapuniat.

**AKAR, BOITEU, &c.**, form a group of six islands and islets extending from one to 4 miles south-eastward of Tanapuniat. Akar island,  $1\frac{1}{2}$  miles in extent and 525 feet in height, the largest and easternmost of the group, is uninhabited and densely wooded. Boiteu and Baba stand on the same reef, with another island lying between them and Akar. The westernmost islet of the group has a sharp summit 240 feet in height.

**Howard rock**, with 13 feet water, lies three-quarters of a mile E. by S.  $\frac{3}{4}$  S. from the north point of Pulo Tanapuniat, and nearly 2 miles northward of Batu Bini.

**Clearing marks.**—The south-west extreme of Mankian Pandok, in line with the south-west extreme of Pulo Gueta, N. by W.  $\frac{3}{4}$  W., leads three-quarters of a mile eastward of Howard rock, and leads also just eastward of the eastern Chabrol patch.

**Batu Laki** is a rock 3 feet high lying midway between the above-mentioned group of islands and Pulo Tanapuniat, at  $8\frac{3}{4}$  cables E.  $\frac{3}{4}$  N. from Tanjong Baluntao, and is steep-to.

**Batu Bini** is a rock that dries 3 feet, situated 4 cables N.  $\frac{1}{4}$  W. from Batu Laki.

**Egeria rock**, a coral head of 2 fathoms with 20 to 30 fathoms at a short distance, lies  $1\frac{5}{16}$  miles S.  $80^{\circ}$  E. from the north-east extreme of Akar island. Half a mile W.  $\frac{3}{4}$  S. from Egeria rock is a patch of  $3\frac{1}{2}$  fathoms with deep water between.

**Nonseu**, about one mile southward of Akar, is the south-easternmost island of the northern group of the Anambas. It is a narrow wooded

Charts 1,371  
[2,579],  
2,344 [2,580].  
Var. 2° E.

island, 195 feet in height, and three-quarters of a mile in length. Foul ground extends for nearly 2 cables southward of the island. The channel between it and Akar is deep and clear, but there are frequently tide-rips across it.

**The Tidal streams** run, flood to south-westward and the ebb to the north-eastward, about one knot per hour in the vicinity of Nonseu island.

**PULO PANJANG** is the largest of a group of ten islands and islets to the northward of Akar, and is 2 miles in length east and west, by half a mile in breadth near its centre. It has two prominent wooded peaks, three-quarters of a mile east and west of each other, connected by a high saddle. The western peak is 1,050 feet and the eastern 1,140 feet in height, and it is the highest island eastward of Siantau. Two islets lie off the southern coast.

Lat. 3° 7' N.  
Long. 106° 27' E.

**Pempang** is the easternmost of a group. It is 460 feet in height, nearly a mile in length, and is fairly steep-to. The island is wooded and inhabited.

**Mantala**, southward of Pulo Panjang, is a narrow wooded island 300 feet in height, and one mile in length.

The island is cultivated in places with cocoanut trees, but is uninhabited.

**Pulo Pujul** and **Pulo Panginding**, connected by reef, and about one cable apart, lie westward of Pulo Panjang and separated from it by Salat Telok Dalam from 2 to 3 cables wide, with depths of 12 to 15 fathoms. The islands together are 2 miles in length, densely wooded, and have a few inhabitants. Pulo Pujul is 760 feet, and Panginding 815 feet in height. Close off the north-west coast of Pulo Pujul there are two high islets, and close to the north point of Panginding is another. An islet, 115 feet high, from which reef projects for a short distance, lies half a mile N.W. by W. from the last-mentioned islet.

**Anchorage.**—There is anchorage sheltered from the southerly winds in a depth of 13 fathoms, sand and coral bottom, in the space between the above-mentioned islets, with the islet close to the north point of Panginding bearing E.  $\frac{1}{2}$  N., and the islet to the northward bearing N.N.E.  $\frac{1}{2}$  E., distant  $3\frac{1}{2}$  cables.

Lat. 3° 11' N.  
Long. 106° 22' E.

**PULO LUYONG**, 375 feet in height, with well-defined peaks, is a narrow wooded island  $1\frac{1}{4}$  miles in length, lying about 2 miles north-westward of Pulo Pujul.

**A patch** of  $2\frac{1}{4}$  fathoms lies half a mile W. by N.  $\frac{1}{2}$  N. from the head of the bay in the low part of Pulo Luyong, with depths of  $3\frac{1}{2}$  to 7 fathoms around.

General chart, 2,680a [2,678].

**Pulo Gueta**, 290 feet in height, is a wooded island, 8 cables in length, lying close southward of Pulo Luyong and on the same reef. Charts 1,371 [2,579], 2,344 [3,580]. Var. 2° E.

**Chabrol patches** are two in number, lying N.W. by W.  $\frac{1}{2}$  W. and S.E. by E.  $\frac{1}{2}$  E. from each other, half a mile apart and steep-to. The western one has a depth of  $4\frac{1}{2}$  fathoms, and is situated 8 cables S. by W.  $\frac{1}{2}$  W. from the south-west point of Pulo Gueta. The other has  $3\frac{1}{2}$  fathoms, and lies one mile S. by E.  $\frac{1}{2}$  E. from the same point.

**Esperance reef**, with a sandbank that dries 6 feet on its southern end, is a reef lying one mile N.E. by E. from the north point of Pulo Luyong. Lat.  $3^{\circ} 12' N.$  Long.  $106^{\circ} 23' E.$

**Shoals.**—A line of sand and coral shoals with  $4\frac{1}{2}$  to 8 fathoms water over them extends 2 miles N.N.E.  $\frac{1}{2}$  E. from Esperance reef. As there may be less water on these shoals they should be avoided. At one mile N.N.E. from Mankian Pandok there is a coral head with  $3\frac{1}{2}$  fathoms water, and a 3-fathoms patch lies two-thirds of a mile S. by E.  $\frac{1}{2}$  E. from the coral head.

A reef awash lies  $1\frac{1}{2}$  miles S.E. by E.  $\frac{1}{2}$  E. from Esperance reef with a clear channel between, having depths of 14 to 16 fathoms.

**Clearing marks.**—The south-east point of Pulo Gueta in line with the north point of Pulo Oro-oro bearing S.  $28^{\circ}$  W. (the entrance to Favorite channel being thus just closed), leads between Esperance reef and the last-mentioned reef, and eastward of the line of coral shoals extending northward of Esperance reef.

**Mankian Pandok**, a small island, 160 feet in height, cleared for cultivation, lies with its peak  $1\frac{1}{2}$  miles north-west of the north extreme of Pulo Luyong. It has a sandy spit at its southern end, and reef extends for nearly 2 cables westward from the island. There are two wooded islets at 2 and 5 cables south eastward of it.

**PULO ISAN**, 570 feet in height, is wooded, of irregular shape and situated north-north-eastward from Pulo Panjang. On the western side and northward of the island, reef and foul ground extend for a considerable distance. Immediately southward of Pulo Isan, there is an islet 280 feet high, with a sandy isthmus extending in a south-westerly direction for a quarter of a mile, connecting it with a promontory 80 feet high. Between this promontory and Pulo Panjang there is a deep passage 4 cables wide. Another islet, Nibong, 135 feet high, is situated close south-eastward of the 280-feet islet.

**PULO SELEI**, 530 feet in height, and 2 miles in length, lies 2 miles eastward of Pulo Isan and is also of irregular shape. Its summit\* shows sharp from the northward and southward, but broad-topped from other views. The bays on the south and east sides are foul and rocky,

Lat.  $3^{\circ} 12' N.$   
Long.  $106^{\circ} 29' E.$

Charts, 1,371  
[2,579],  
2,244 [2,580].  
Var. 2° H.

the one on the north side is also foul near the head, but it affords anchorage in a depth of 13 fathoms in the centre, with protection from southerly winds. A narrow island, 305 feet high, and one mile in length, lies close to the north-westward of Pulo Selei, affording temporary protection on its south-east side from northerly winds, but the anchorage was not closely sounded. There is only a narrow boat channel between the points of the island.

**Bossom**, a wooded island 3 to 4 cables in extent and 335 feet in height, lies north-west of the island just mentioned, with an islet 110 feet high between, with which it is connected by reef. A small patch awash lies 2 cables S.S.W. of the 110-feet islet.

**Kudok**, a small islet 85 feet high, lies  $1\frac{3}{10}$  miles S.W. from Bossom.

**SAGU DAMPAR** and **SAMA**, 500 and 225 feet high, respectively, standing on the same reef and close to each other, are together nearly 2 miles in length; the south-eastern part of Sagu Dampar lies 7 cables westward of Bossom. Nearly in the centre of the channel between them is a rock awash at low water,\* with depths of 4 to 7 fathoms close around it, lying  $5\frac{1}{2}$  cables W.  $\frac{3}{4}$  S. from the south point of Bossom. With the exception of this rock the channel is clear, passing westward of Pulo Selei and Bossom. Between Pulo Isan and Sagu Dampar, the ground is too foul for a vessel to attempt a passage.

**PULO LUBONG GAI**, is a narrow wooded island of smooth outline, 335 feet high and 2 miles in length, with Ipil islet close to its southern end. It lies 2 miles north-west from Sagu Dampar with a deep and clear channel between.

**Pulo Manguan** lies close westward of the north point of Lubong Gaii, and is  $1\frac{1}{2}$  miles in length. The summit, 465 feet high, shows conspicuously.\* The space included between the south coast of this island and the coast of Pulo Lubang Gaii is studded with reef.

**Mankian**, 140 feet in height and cultivated with cocoanut trees, lies  $1\frac{1}{2}$  miles south-west of Lubong Gaii. Reef extends on all sides to a distance of one to 2 cables except to the north-eastward, where it skirts the island closely. The passage between Mankian and Lubong Gaii is clear of danger.

**A patch** of  $2\frac{1}{2}$  fathoms, coral, lies S. by W. about 7 cables from the south extreme of Mankian, steep-to on its southern side.

**Hale patch**, with a depth of  $3\frac{1}{2}$  fathoms over a coral bottom, is small and situated  $1\frac{1}{2}$  miles N.W by W. from the northern extreme of Pulo Mankian.

\*Lat. 3° 15' N.  
Long. 106° 21' E.

**Thetis reef** is a coral reef half a mile in length, lying 2 miles W. by S.  $\frac{3}{4}$  S. from Pulo Mankian, with depths of 11 to 12 fathoms between.

Patches with 3 to 5 fathoms on them extend for one mile to the northward of this reef, and there is a patch of  $4\frac{1}{2}$  fathoms S.S.W. of Thetis reef. A patch of 4 fathoms lies 6 cables westward of Thetis reef.

There is a narrow reef over one mile in length, with a sand cay that dries 5 feet, lying with its north end one mile S.W. by W. from Thetis reef.

**Sampa**, an islet 200 feet high, wooded, and 7 cables in length, lies close north-west of Pulo Manguan.

**Matiana**, one-third of a mile in length and 180 feet in height, lies  $1\frac{1}{2}$  miles northward of Sampa, with a rock or islet 30 feet in height in the channel between.

**PULO MINJALIN**,\* Pulo Stuju, Pulo Lamun, and Pulo Passu, \*Lat.  $3^{\circ} 23' N.$  Long.  $106^{\circ} 26\frac{1}{4}' E.$  constitute a group of islands occupying a space nearly 2 miles square, situated about 5 miles eastward of Pulo Kelong; they are the north-easternmost islands of the Anambas. Pulo Minjalin the westernmost and largest of the group is  $1\frac{1}{2}$  miles in length with a rounded summit 430 feet in height near the centre. The western coast is embayed, but the water is too deep to afford convenient anchorage.

**Pulo Stuju**, a level-topped narrow island, 215 feet in height, lies north-eastward of Minjalin and on the same reef.

**Pulo Lamun**, about one mile in length, lies eastward of Minjalin. Reef extends south-eastward of it for upwards of half a mile.

Pulo Passu, with a conical summit, 200 feet high, lies close north-eastward of Pulo Lamun, with islets and rocks between.

**Anchorage**.—On the east side of Pulo Minjalin, in the bay formed by the projection to the eastward of the other islands of the group, there is temporary anchorage in a depth of 15 fathoms, sand and coral, with the south-east extreme of Minjalin bearing S.W.  $\frac{1}{2}$  W., distant 4 cables.

**Alarm bank** lying three-quarters of a mile E.N.E. from Pulo Passu, is a bank of sand and coral half a mile in extent, with depths of  $4\frac{3}{4}$  to  $5\frac{1}{2}$  fathoms on it, and possibly less water. A small patch of 6 fathoms lies  $1\frac{1}{10}$  miles E.N.E. from Pulu Passu with 21 fathoms between, and nearly half a mile still further eastward a cast of 15 fathoms has been obtained. Heavy overfalls and tide-rips mark these banks, and they should be avoided.

**Thetis channel** lies between the islands and islets immediately fronting the east coast of Niulwan, and those groups of islands lying to the eastward that have just been described. Its northern entrance lies between Pulo Kelong and Pulo Minjalin, and its general direction is south, between

Charts, 1,348  
[2,581]  
2,104 [2,592],  
Var. 2° E.

the several reefs that have been described in connection with the islets contiguous to them. The depths range from 29 to 36 fathoms in the northern part decreasing to 11 and 12 fathoms in the central parts. It probably could be navigated from aloft with the sun in a favourable position, but there is apparently but little to be gained in using it. The route outside the islands seems preferable.

**Tidal streams.**—In Thetis channel the flood sets to the southward and the ebb to the northward, at the rate of from three-quarters to 1½ knots per hour.

### NATUNA ISLANDS.

**General remarks.**—The Natuna islands extend in a north-north-west direction 190 miles from Tanjong Api, the north-west extreme of Borneo. They may be divided into three groups; the South Natuna; the Great Natuna; and the North Natuna.

They belong to the Sultan of Rhio-Linga (Vol. I.).

Lat. 2° 0' N.  
Long. 109° 10' E.

**API PASSAGE**, between the coast of Borneo and the southern-most islands of the South Natuna group, appears to be free from danger, with general depths of 10 to 16 fathoms. The coast, forming its southern boundary, Tanjong Api to Tanjong Datu and the dangers inshore are described on pages 54, 55; and the Natuna islands and dangers forming its northern boundary, below.

The least water known on the recommended track for steam vessels through Api passage during the north-east monsoon period is 8 fathoms, at about 12 miles north-westward of Cape Datu. There is said to be but 5 fathoms where depths of from 7 to 12 fathoms are shown on the chart, 13½ miles W. ¼ S. from Cape Datu, southward of its fairway, and about 6 miles off the shore. See directions, &c., page 133.

On account of the strong south-westerly current which prevails during the north-east monsoon from 16 to 19 hours at a time, this passage is not recommended for sailing vessels; these vessels should take one or other of the passages between the Natuna group as mentioned on page 37. See tides, page 54.

**SOUTH NATUNA ISLANDS.**—This group, consisting of several islands, reefs, and shoals, is separated from the north-west coast of Borneo by Api passage, and extends to about lat. 3° 4' N. The two principal islands are Sirhassen and Subi; for principal town see page 95.

**The depths** around the South Natuna group vary from 10 and 15 to 30 and 40 fathoms, and south-eastward to the coast of Borneo average from 14 to 20 fathoms.

**Current.**—The current at times is strong among the South Natuna islands, according to the prevailing winds. In Koti passage it has sometimes been found to run  $2\frac{1}{2}$  miles per hour northward, during the south-west monsoon.

Charts, 1,348  
[2,581], 2,104  
[2,682].  
Var.  $2^{\circ}$  E.

**The channel** between Subi and Low island is ordinarily used by sailing vessels proceeding to China by the Palawan route, during the north-east monsoon, although, as has been previously remarked, page 37, it sometimes happens that vessels are unable to weather Subi, and find it convenient to proceed through the Koti passage.

Lat.  $3^{\circ} 0' N.$   
Long.  $108^{\circ} 29' E.$

**St. Pierre islands**, at the south-west end of the group, consist of two wooded islands, connected by a reef which dries at low water; a narrow coast-reef surrounds them. The westernmost is the higher and larger island; the other is 282 feet high.

**LIGHT.**—Upon the westernmost island is exhibited, at an elevation of 334 feet above high water, a *white flashing* light showing *one flash* of short duration every *five seconds*, visible in clear weather from a distance of 24 miles. The light is obscured on the bearing of S.  $80^{\circ}$  W. when within 3 miles of it, by North-east island.

Lat.  $1^{\circ} 54' N.$   
Long.  $108^{\circ} 40' E.$

**St. Pierre rock**, 8 feet high and steep-to, lies S.  $4^{\circ}$  W.  $2\frac{1}{4}$  miles from the lighthouse on the western island. This rock is about 30 yards in length, and has depths of 14 to 19 fathoms close around. The channel between the islands and the rock has depths of about 20 fathoms.

**Tides.**—The ebb stream between the St. Pierre islands and Tanjong Api sets to the southward, and the flood, which prevailed during the examination of St. Pierre rock, set to the north-east. Springs rise 4 feet.

**Marundum**, an uninhabited island principally composed of mangrove-swamp, is 120 feet in height, about a mile in extent, and the south-easternmost island of the group; it is distant 14 miles from Tanjong Api. A reef, dry at low water, lies about a mile off its west side, and there is a patch of  $4\frac{1}{2}$  fathoms about the same distance from its north-east side; the depths around the island are very irregular.

Lat.  $2^{\circ} 4' N.$   
Long.  $109^{\circ} 6' E.$

**South Haycock islet**, situated about 17 miles north-westward of Marundum, is surrounded by a reef to the distance of a third of a mile; there is a rock above water, close southward of the islet.

**Sembuni and Molu shoals** comprise an extensive mass of dangers lying between Marundum and Sirhassen. The Sembuni is the name given to that portion which lies nearer to Marundum, the channel between that island and the shoals being 7 or 8 miles wide, with depths varying from 7 to 16 fathoms.

Molu shoals lie about 5 miles eastward of South Haycock islet, and cover a space about 7 miles in extent in a N.E. by E. and opposite

Charts, 2,104  
[2,582].  
2,149 [2,583]  
Var. 2° E.

Lat. 2° 21' N.  
Long. 109° 7' E.

Lat. 2° 24' N.  
Long. 101° 0' E.

direction. Kapang reef, and a 9-feet reef 2 cables in extent situated  $1\frac{1}{2}$  miles from its western end, are the southernmost charted dangers of the Molu group. The channel between Sirhassen islet and these shoals has depths varying from 11 to 20 fathoms.

**A rock** with less than 6 feet water lies north-east of Molu shoals, with Prantu island bearing N.  $\frac{1}{4}$  E., distant  $5\frac{1}{2}$  miles. Eastward of this rock is a space 7 or 8 miles in extent, which has not been sounded over, and where it is probable other dangers may exist.

**Sirhassen passage** is bounded on the south by South Haycock islet and the northern part of the shoals and dangers just described, and on the north by Sirhassen and its contiguous islands. Its narrowest part, between the rock north-east of the Molu shoals and Prantu island is about 5 miles wide, and appears to be free from danger, but the depths in this neighbourhood are very irregular, ranging from 14 to 40 fathoms.

It is sometimes used by sailing vessels proceeding eastward against the north-east monsoon, as mentioned on page 38.

**SIRHASSEN ISLAND** is 9 miles in length east and west, and mountainous, except on its north side, where there is a low sandy shore forming a bay having depths of 10 to 15 fathoms. Koti head, the west extreme of the island, and the coast eastward, is foul as far as the bay. Mount Koti is 765 feet in height. A shoal marked P.D. is charted nearly 4 miles W.S.W. of Koti head. A vessel named the *Lightfoot* was said to have struck on it in 1854.

Nearly joining the island on its south-west side are several islets, the largest of which, Brian island, is 760 feet high. These islets, having but very narrow channels between them, appear at a distance as part of the main island.

**Anchorage.**—There is anchorage south-west of Koti head.

A chain of islets extends about 7 miles in a north-north-east direction from the north-east point of Sirhassen, affording partial shelter from north-easterly winds in the bay northward of Sirhassen before mentioned.

There is a sunken reef off the east end of the bay, and a rock which breaks near the west end; also a patch of 3 fathoms is charted  $2\frac{1}{2}$  miles W.N.W. of Inamuk island.

The islets to the north-north-east are named Ganting, Sumpadi, Bango;

\*Lat. 2° 28 $\frac{1}{2}$ ' N.  
Long. 109° 10' E. Rikel, Sadaur, and the low rock Kepalu.\*

Lat. 2° 28' N.  
Long. 109° 10 $\frac{1}{2}$ ' E. **A reef**, with a depth of 6 fathoms over it, is situated north-eastward of Sirhassen island, from which the north point of Ganting islet bears S. 79° W., distant  $1\frac{1}{2}$  miles.

**Prantu**, a small island, 465 feet high, lies nearly 3 miles southward of the eastern extreme of Sirhassen, with depths of 20 to 40 fathoms in the channel between them.

**Royalist haven** is situated on the south-west side of Sirhassen island. The entrance is about 2 cables wide between Rimell and Wilkinson rocks, with 7 to 10 fathoms in the channel, and in the haven. There are several rocky heads with deep water between them, in and near the anchorage, which has depths of 9 to 10 fathoms, and is situated nearly half a mile within the entrance; but a vessel may thread her way carefully, between the coral heads for at least 2 miles northward, towards Banff bay.

The leading mark into Royalist haven is mount Koti in line with David point, bearing N.N.W.  $\frac{1}{2}$  W.; see view on plan 2,140 [2,583].

**KOTI PASSAGE**, which separates Sirhassen from Pulo Panjang, is 9 or 10 miles wide; the depths are irregular, 15 to 30 fathoms generally, with deeper water in places, near mid-channel.

This passage is sometimes used by sailing vessels proceeding from Singapore to Hong Kong against the north-east monsoon, and unable to weather Subi.

**Haynes shoal**, with a depth of  $3\frac{1}{2}$  fathoms, is charted with Koti head bearing E.  $\frac{1}{2}$  S., distant 8 miles.

**Milton shoal**, lying W. by N.  $\frac{3}{4}$  N., distant  $9\frac{1}{2}$  miles from Koti head, and N.N.W.,  $3\frac{1}{2}$  miles from Haynes shoal, was reported by the master of the *John Milton*, 1869, to consist of coral, and to be a quarter of a mile in extent, with a depth of  $4\frac{1}{2}$  fathoms upon it.

**The reef** extending southward and westward of Pulo Kordu, north side of Koti passage, is reported to extend about one mile further southward than charted.

**Anchorage**.—The Netherlands s.s. *Flamingo* anchored in a depth of  $8\frac{1}{2}$  fathoms in 1896, in the bight westward of Panjang, with the extremes of Sipu bearing N.  $25^{\circ}$  W. and N.  $2^{\circ}$  W., and the south point of Panjang N.  $77^{\circ}$  E.

**SUBI**, the northernmost and largest of the South Natuna islands, is about 13 miles in length north and south, and 5 miles in breadth, including an island about 2 miles in extent off its northern end, to which it is connected by a reef. It is also apparently connected by a reef with the islets Sabiung and Sipu lying about 6 miles to the southward. Between these islets and Panjang, an island about 4 miles in length north-east and south-west and encircled by a broad reef which extends 3 miles south-westward from its southern end, there is a channel about a mile wide in which the depth is from 9 to 13 fathoms.

Subi appears to be surrounded, except on its south-west side, with shelving ledges, to the distance of 2 or 3 miles; on their outer edges are several rocky islets, the principal of which is Buku, on the west side of the island. There are others in a similar position on the west and south sides of Panjang.

Charts. 2,104  
[2,582].  
2,140 [2,583].  
Lat.  $2^{\circ} 27\frac{1}{2}'$  N.  
Long.  $109^{\circ} 2' E.$   
Var.  $2^{\circ}$  E.

Charts, 2,104  
[2,582].  
1348 [2,581].  
Lat.  $2^{\circ} 40' N.$   
Long.  $108^{\circ} 34' E.$   
Var.  $2^{\circ} E.$

**Seraia**, or West island, 865 feet high, lies 16 miles south-westward of Subi, with Dua rock  $1\frac{1}{2}$  miles north-eastward of it.

**Reefs.**—Pumumabung reef, lying about 3 miles West of the Panjang group, is about 2 miles in length, east and west, with depths of 7 to 10 fathoms near it. A reef, with a depth of 2 fathoms over it, is situated 7 miles N.  $55^{\circ}$  E. from Dua rock; and another, with a depth of 5 feet over it,  $8\frac{1}{2}$  miles N.  $48^{\circ}$  E. from Dua rock. Jabak reef lies  $3\frac{1}{2}$  miles N.N.W. from Pumumabung reef; and North, distant  $3\frac{1}{2}$  miles of Dua rock, is Jaring reef, with suspicious ground extending about 3 miles to the north-eastward. A reef, with a depth of 5 fathoms over it, is situated  $7\frac{1}{4}$  miles N.  $14^{\circ}$  E. from Dua rock.

Lat.  $2^{\circ} 42' N.$   
Long.  $108^{\circ} 41' E.$

The master of the s.s. *Swanley* reported, 14th October 1904, that his vessel struck on a coral patch lying about midway between Dua rock and Pumumabung reef, in a position from which the former bears West, distant  $4\frac{8}{10}$  miles, and Buku island centre N.  $11^{\circ}$  E. *Swanley* reef is about 2 cables long, east and west, three-quarters of a cable wide, with 6 feet least depth over it, and deep water around.

A shoal, with a depth of  $3\frac{1}{2}$  fathoms and probably less water, lies with the northern extremity of Subi bearing S.  $83^{\circ}$  W., distant  $8\frac{1}{2}$  miles. Laut reef lies off the east side of Subi, about  $2\frac{1}{2}$  miles outside the reef surrounding the island. Robin Hood reef, about half a mile long east and west, lies nearly 5 miles N.E. from the north-east end of Pulo Panjang.

Vessels should be cautious in approaching Subi.

Lat.  $3^{\circ} 0' N.$   
Long.  $107^{\circ} 45' E.$

**LOW ISLAND**, situated 60 miles westward of Subi, is about 3 miles in length east and west, and 2 miles in breadth; it rises gradually to an ill-defined summit 545 feet high (top of trees), and is densely wooded. The island is surrounded by a coral reef, but landing may generally be effected on the lee side.

Shallow water extends off the western side of the island, terminating in a patch of coral with 4 fathoms water, at a distance of 2 miles W. by S.  $\frac{1}{2}$  S. from the south-west point of the island.

On the north side there are many extensive reefs which have not been examined. The passage northward of Low island should not be attempted.

**Jackson reefs** lie on the east side of Low island between the bearings of E. by N.  $\frac{1}{2}$  N. and E. by S.  $\frac{1}{2}$  S., distant from 2 to  $3\frac{1}{2}$  miles from the eastern point. The depths on the heads are from 3 to 4 fathoms with deep water close-to.

**Yong Sabal bank.**—A shoal of this name is charted W.  $\frac{5}{8}$  S. 20 miles from the south-west point of Low island; its position is marked as being doubtful.

**Diana reefs.**—This coral reef consists of a number of isolated patches covering a space about 2 miles in extent in a north-east and south-west direction. H.M. brig *Diana* grounded on it. The centre of the reef is charted with the north-west extreme of Low island bearing S.E. by S., distant 9 miles.

Between Diana reefs and Elphinstone rock it is supposed that several dangers exist.

**North Haycock islet,** high, and of conical shape, has a reef encircling it, to a distance of several miles apparently. A patch of 2 fathoms is charted 5 miles south-south-west of the islet, and others may exist.

**Elphinstone rock,** 69 feet high, is charted as being nearly a mile in length. A rock just above water lies half a mile southward of it, with depths of 6 to 7 fathoms some distance beyond. Off the north end there are depths of 6 to 7 fathoms, and possibly less, extending for the distance of about 2 miles. In a dark night with thick weather a ship would be on this rock before it could be seen, as the soundings are no guide, and drop from 40 to 20 fathoms in a cast.

**GREAT NATUNA ISLAND**, known as Pulo Bung uran by the Malays, is about 38 miles in length, north and south, and 25 miles in breadth; two islets lie on the reef extending about 3 miles northward of the island.

The interior of Great Natuna is mostly high; on the northern part are mount Bedong, or Quoin hill,\* and mount Ranai, near cape Senubing, the east point of the island; the latter mount is 1,890 feet high, and may be seen about 45 miles in clear weather. Some of the projecting parts of the coast are rather low, particularly from between cape Senubing and the north end of the island, where there are red cliffs.

The island is inhabited by Malays and by natives of Borneo who have some trade with the neighbouring islands and with the mainland. The principal settlement and the most frequented anchorage is at Sedanau island on the west side.

Isolated reefs extend off the eastern and western coasts of this island, from 10 to 20 miles, rendering it dangerous to approach, except with a look-out aloft and the sun in a favourable position for observing the reefs. The most important are described here, for others see the chart.

**Caution.**—The channel between the Natuna and Anamba islands is safe in daylight; but as several shoal coral patches have been discovered the assigned positions of which are but approximate, and other shoals probably exist in the vicinity of the Natunas, a good look-out aloft is necessary. Vessels should pass well to the westward of the position assigned to the Young Sabal bank.

General chart, 2,660a [2,678].

Chart, 1,348  
[2,581], with  
plan of Salat  
Lampa.  
Var. 2° E.

\*Lat. 3° 34' N.  
Long. 108° 2' E.

**Islets and dangers off the south and east coasts.**—The western and southern coasts of Great Natuna are fronted by high islands, the chief of which are Sedanau and the Duperré islands, the latter lying near its south-west extreme. Sedadap\* is the southernmost of the Duperré islands.

**Salat Lampa**, or La Place strait, is the channel separating Great Natuna from the islands Batang and Lingung of the Duperré group. It has an average width of  $1\frac{1}{2}$  miles, with depths of 16 to 20 fathoms in the fairway. Serantas island lies in the southern entrance, from which a reef extends half a mile eastward reducing the channel between it and Natuna to a breadth of about half a mile. There is apparently no channel westward of Serantas.

Verdier reef lies near the fairway abreast Kombeh strait, the channel between Batang and Lingung islands. Other dangers may exist, and the channel should only be used by those acquainted with it.

**Menterado breakers** are charted 3 miles S.S.E. of Sedadap, the southernmost islet of the Duperré group.

Lat. 3° 38' N.  
Long. 108° 19' E.

**Lamiena reef**, on which the Dutch vessel *Lamiena Elizabeth* struck, off the south-east coast of Great Natuna, is said to lie with Kamodi and Jantai islets nearly in line bearing N. by E.  $\frac{3}{4}$  E.†; the nearest high land on Natuna W. by N.  $\frac{1}{4}$  N., the south point of the same W.  $\frac{1}{2}$  N.; and the south point of Lingung island about W. by S. A 2-fathoms patch is charted about one mile N.N.E. of the assigned position of Lamiena reef..

**Reefs.**—Three reefs lie S.E. by S. of Kamodi, east side of the island, the farthest being 7 miles distant in that direction; another reef, about a mile in extent, lies 5 miles eastward of cape Medang; the nearest reef to Kamodi islet is named Sungot, and breaks. Penungul reef lies 5 miles north-eastward of Kamodi, and is probably the one discovered by Mr. Whiteside, commanding the ship *Sarah*, who describes it as an extensive coral bank in patches, in passing over which the ship received a slight shock; at the time a small island off the Great Natuna bore S.W. by W. distant about 6 miles (the bearing is the same as that given for Devonport rock).

Lat. 3° 54' N.  
Long. 108° 31' E.

**Devonport rock**, on which the British ship *Devonport* struck and was lost in 1869, has 17 feet water, with 34 fathoms in its vicinity. From the ship, Senoang island bore N.W., and Kamodi island S.W. by W.

**A reef**, about half a mile in extent, with a least depth of 4 feet over it, and a depth of 10 fathoms around, lies in a position with cape Senubing bearing N. 35° W., distant about 4 miles, and Kamodi island S. 5° W.

**Anchorage** may be taken in Ranai road, to the southward of cape Senubing, in a depth of from 9 to 12 fathoms.

† The islets reported as being in line are not nearly so on the bearing given, and the position charted is doubtful.

**Miole reef**, about 2 miles in length, lies with its centre, which uncovers at low water, about 2 miles N.E. by E. from Senua island, off the north-east side of Great Natuna.

Chart, 1,348  
[2,581].  
Lat. 4° 4' N.  
Long. 108° 26' E.  
Var. 2° E.

A reef, nearly a mile in diameter, bars the passage inside Senua.

**West coast.**—**Sedanau island**, about 4 miles in length, fronts the large bay on the west side of Great Natuna island. As shown on the chart, the island is encircled by a considerable reef, except off its south end; the bay also is blocked, having but a narrow channel also encumbered with reefs, between the two.

**Anchorage** may be taken in a depth of 12 fathoms just within the south extreme of the island, with that point bearing W. by S., the south-east extreme N. by W.,  $\frac{3}{4}$  W., and Serungus island E.  $\frac{3}{4}$  N.

**To enter**, steer in northward of Batu Nenen with the south point of Sedanau bearing E. by N.  $\frac{3}{4}$  N., passing about  $1\frac{1}{2}$  cables southward of it, having avoided the reef to the westward. Then steer for Serungus island until the vessels off the town are in sight, then haul up for them, and anchor as above described. The roadstead off the town is  $1\frac{1}{2}$  miles farther up, and the passage encumbered with reefs.

**Town.**—Sedanau, on the east side of the island of that name, is the capital of the Anambas, Natunas, and Tambelan groups, pertaining to the Sultanate of Rhio-Linga, where also the representative of the Sultan resides. Good drinking-water is obtainable here.

**Islets and dangers.**—**Batu Nenen**, off the south-west coast of Great Natuna, breaks heavily, and is charted with the peak of Salaor island bearing N. 6° W., and the south extreme of Pulo Sedadap S. 42° E.; it is probably identical with the reef charted eastward of it.

Lat. 3° 42' N.  
Long. 107° 55' E.

**Salaor**, or Peaked island, lies about  $6\frac{1}{2}$  miles from the centre of the western side of Great Natuna.

Many dangers exist in the channels between Great Natuna island and Sedanan, Salaor, and Batu Bilis, and these passages should not be attempted.

**Seluan**, or North-west island, 10 miles off the north-west side of Great Natuna, has a reef projecting a mile or more from its south point and apparently from its other sides; a reef lies  $2\frac{1}{2}$  or 3 miles from the western side of this island.

**A reef** of coral, with 2 fathoms water, and 20 to 30 fathoms near its west and south-west sides, lies about 5 miles S. by W.  $\frac{1}{2}$  W. from Seluan island; about 5 miles S.W.  $\frac{3}{4}$  S. from the above reef is another coral patch with 3 fathoms water, and from 18 to 20 fathoms, mud, close around. A reef is also charted 3 miles W.N.W. of the 3-fathoms patch.

Lat. 4° 3' N.  
Long. 107° 47' E.

**Semapi reef**, dry at low water, and apparently of considerable extent, lies midway between Seluan and the north point of Great Natuna.

**Bengara reef** lies near Great Natuna, with Pulo Bugna bearing N. 60° E., and Pulo Butoni N. 20° E. For others close in, see the chart.

Chart. 1,348  
[2,681].  
Lat.  $4^{\circ} 3' N.$   
Long.  $107^{\circ} 22' E.$   
Var.  $2^{\circ}$  E.

**Tokong Boro or Pyramidal rocks**, a cluster of rugged rocks, about 20 feet in height, lie due West of Mount Bedong, distant about 38 miles from the coast of Great Natuna.

A rock, 6 feet above water, is reported to exist at a distance of 7 miles N.  $2^{\circ}$  E. from Tokong Boro.

Lat.  $4^{\circ} 11' N.$   
Long.  $107^{\circ} 34' E.$

**Doubtful rock**.—A doubtful rock is charted as existing about 15 miles N.E. by E. from the Pyramidal rocks, and the same distance westward of the north point of Seluan islands. A Netherlands Government Notice, published at Batavia in 1857, states that a rock, 25 feet above water, was discovered lying N.E. by E.  $\frac{1}{4}$  E. of the Pyramidal rocks, in the longitude noted; notwithstanding, the Dutch charts have it marked E.D.

Lat.  $4^{\circ} 22' N.$   
Long.  $107^{\circ} 55' E.$

**Success reef**, which breaks, is charted as being about 2 miles in extent, and as lying midway between Semione island and the north point of Great Natuna; it is apparently steep-to on its eastern side.

A coral bank, with a depth of 4 fathoms over it, situated about 6 miles south-eastward of Success reef, lies with Butonn islet bearing S.  $2^{\circ}$  W., distant  $10\frac{1}{4}$  miles, and cape Ju, the south point of Panjang island, S.  $88^{\circ}$  E.

Lat.  $4^{\circ} 31' N.$   
Long.  $107^{\circ} 42' E.$

**Semione or Saddle island**, 360 feet high, is well wooded; it is apparently encircled by a reef which is steep-to.

There is a rock above water about 4 miles S. by W.  $\frac{1}{4}$  W. from this island, with a depth of 28 fathoms between.

**The NORTH NATUNA ISLANDS** are of moderate height; they are inhabited by Malays and a few Chinamen, and produce cocoanuts, bananas, oranges, and other fruits. There were about 700 inhabitants in 1893, under a chief who resides on the west side of Pulo Laut. The islands belong to the Sultan of Rhio-Lingga.

The islands comprise Pulo Laut or North Natuna, 8 miles in length, with Stokong, a smaller island, near its northern extreme, and several islets and rocks close to its southern end upon the reef that fronts it. See anchorage, page 98.

**Landing** may be effected by passing over the reef on the eastern side of Pulo Laut to the sandy beach, at or near high water.

**Reefs**.—The island is encircled by reef, which is reported to extend some 3 miles to the westward, 5 miles south-westward, and about 4 miles south-eastward and eastward. The depths for about one mile off the eastern edge range from 8 to 13 fathoms, uneven bottom, thence from 18 to 20 fathoms will be found till nearing Batu Penuh.

The depths around this group are very irregular.

**Islet**.—A rocky islet, 56 feet in height, lies about  $2\frac{1}{2}$  miles S. by E.  $\frac{1}{4}$  E. from the south-east point of Pulo Laut.

**Glamis Castle rock**, on which the British steam vessel, *Glamis Castle*, is said to have struck in 1878, has a depth of 10 feet, and lies with the north point of Stokong island bearing N.N.W., and the south-east point of Pulo Laut S.W. It is probably very near the shore reef.

Chart, 1,348  
[2,581].  
Lat.  $4^{\circ} 47' N.$   
Long.  $108^{\circ} 4' E.$   
Var.  $2^{\circ} E.$

A patch of  $4\frac{1}{2}$  fathoms lies southward of Glamis Castle rock with the north point of Stokong bearing N.N.W.  $\frac{1}{4}$  W., and the south extreme of Pulo Laut S.W.  $\frac{3}{4}$  W. It is probably near the edge of the shore reef. About 5 miles eastward of this patch a depth of 7 fathoms has been reported by the *Laurel*.

**Doris reef**, a coral head, with one foot water, on which the Swedish barque *Doris* was wrecked in 1893, is part of the shore reef; it lies with Stokong east extreme bearing N.  $\frac{1}{8}$  E., and the south-east extreme of Pulo Laut W. by N. A patch awash lies about midway between it and the 56-feet islet, near the edge of the reef.

**Gloria reef**, composed of coral and stones, on which the Spanish steam vessel *Gloria* was wrecked in May 1877, lies  $5\frac{1}{2}$  miles south of Pulo Laut. From the wreck, lying in 15 feet water, the west extreme of Pulo Laut bears N.N.W.; and the south extreme of Semione island W.S.W. The cylinders of the engines of this vessel showed well above low water in 1893.

**Louise reef**, on which the French ship *Louise et Marguerite* struck in 1873, lies about 2 miles south-eastward of Gloria reef, with which it is probably connected, there being a depth of 2 fathoms midway.

Lat.  $4^{\circ} 35' N.$   
Long.  $107^{\circ} 59\frac{1}{4}' E.$

The vessel at the time of striking drew 15 feet, and then a sounding of 11 fathoms was obtained. Bearings were taken immediately after the vessel cleared the danger, when the islet, 56 feet high, bore North (westerly) and the west point of Pulo Laut N.N.W.  $\frac{1}{4}$  W.

**Batu Penuh** is from 2 to 3 miles in extent, and the least water obtained by the boats of H.M.S. *Archer* in 1893 was  $3\frac{3}{4}$  fathoms, with the south-east extreme of Pulo Laut bearing W.N.W. distant  $8\frac{3}{8}$  miles. Less water may exist. Belknap rock on which an American barque was wrecked, apparently forms part of the above-mentioned shoal; the rock, however, with 17 feet, is charted about 2 miles nearer the south-east end of the island, with Stokong bearing N. by W., but a depth of 19 fathoms was found near that position.

**Karang Tuman**, with a depth of 4 fathoms, lies with the east extreme of Stokong, bearing N. by W.  $\frac{1}{8}$  W., the 56-feet islet N.W. by W.  $\frac{1}{4}$  W. and the centre of Semione W. by S.  $\frac{1}{8}$  S. Another patch, Karang Kia, is said to lie S.W.  $\frac{1}{4}$  S., distant 2 miles from it.

**Cockeran bank**, with  $8\frac{1}{2}$  fathoms water, lies about 6 miles westward of Louise reef, with Semione island bearing W. by S.  $\frac{1}{4}$  S., distant 11 miles.

Charts, 1,348  
[2,581].  
1,355 [2,513].  
2,041 [2,529].  
Var. 2° E.

Lat. 4° 39' N.  
Long. 108° 0' E.

**Caution.—Anchorage.**—Other dangers may exist as these waters have not been surveyed; a good look-out aloft should be kept, and a slow speed maintained when in the neighbourhood of the Natunas.

H.M.S. *Archer* anchored about 6 cables eastward of the rocky islet (56 feet), in 12 fathoms, sand, with depths of 9 to 12 fathoms around, not far from the edge of the shore reef. The islands were approached with the islet in line with the south-east extreme of Pulo Laut.

### EAST COAST OF THE MALAY PENINSULA, WITH THE OFF-LYING ISLANDS AND DANGERS.

#### The EAST COAST of the MALAY PENINSULA,

\*Lat. 1° 31' N.  
Long. 104° 17' E.

from Sitajam point,\* to abreast Pulo Varella, is mostly low and wooded, its general direction being north-north-west. Near the coast, especially off the points, there are rocks, both above and below water, but they appear to lie within the 3-fathoms line of soundings, with the exception of Gading rocks, near Blair harbour; so that when northward of Rumenia shoals, situated about 10 miles south-eastward of Sitajam point, the coast in most parts can be safely approached by the lead. The space between Sitajam point and Sedili Kechil river, was sounded over by H.M.S. *Saracen*; no danger was discovered, and the depths were found to decrease gradually towards the shore.

Vessels from Siam bound to the southward against the south-west monsoon, generally find it most convenient to keep as close as possible to the Malay coast, where regular tidal streams prevail whilst a constant northerly current is found a few miles from the coast. It must be borne in mind, however, that the coast has not been closely surveyed.

The coast southward of Sitajam point is described in China Sea Directory, Vol. I.

Lat. 2° 7' N.  
Long. 104° 14' E.

**Off-lying islands.**—**Pulo Eu**, a round bluff rock, is the south-easternmost of a chain of islets and rocks which lie parallel to and about 12 miles from the east coast of the Malay peninsula.

**Ambong reef** lies 7 miles north-west of Pulo Eu; and nearly in a line between them lie four islets, or rocks above water, named respectively, Chups, Chondong, Gantang, and Belelei.

**Lima island**, lying about 1½ miles north-west of Ambong reef, is nearly half a mile in extent, having two rocks above water, named Raket, about half a mile E.S.E. of it; another rock lies just to the northward of its west extreme, and one named Sangul, nearly a mile west-north-west from the island; they all appear to be connected and surrounded to a short distance by a reef.

**Channels.**—There appears to be a safe channel,  $2\frac{1}{2}$  miles wide, between the islands north-west of Pulo Eu and the Sibu group, with depths of 9 to 14 fathoms.

**Sibu islands** consist of one large and several small islands and rocks. Sibu island, the northernmost, situated about 5 miles from the coast, is a narrow island three miles in length with a hill, 553 feet high, near its south end, overlooking a small bay, from the western point of which a dry bank extends about half a mile. A small island, named Middle Sibu, and two islets or rocks named Sibu Kukus and South Sibu, together with other rocks, both above and below water, extend in a south-easterly direction from Sibu, for a distance of 2 miles.

**Reef.**—A reef fronts the western and south-west sides of the Sibu group to about  $1\frac{1}{2}$  miles in places, except at the north-west end of Sibu island which is steep-to. Close to the north-east point of Sibu is a rock upon the inner part of a narrow bank which projects in a northerly direction about 2 miles; over this bank are depths of 4 to 5 fathoms, with 7 to 8 fathoms on either side of it.

**Sibu channel**, between the Sibu islands and the mainland, is about  $2\frac{1}{2}$  miles wide in the navigable part, with general depths of 6 to 8 fathoms. The depths decrease regularly towards the main, but shoal suddenly from 9 or 10 fathoms to 3 fathoms on Sibu reef.

**Pulo Tingi**, 2,046 feet in height, situated 5 miles north-north-eastward from Sibu island, is about  $3\frac{1}{2}$  miles in length and 2 miles in breadth; on its north side is a small bay, on the shores of which there are cocoanut and banana trees, and a small village.

Water is obtainable on the west side of Tingi; its wells are dry at times, about August.

**Islets and rocks.**—A cluster of islets and rocks extend nearly 2 miles south and south-eastward from Pulo Tingi, the outermost of which is named Sembang; a sunken rock is charted nearly half a mile eastward of Lantin the next island northwards. About half a mile from the north-east shore of Tingi lies Ibul islet, with Peniambang islet between it and the shore; sunken rocks extend a short distance east of Ibul.

About  $1\frac{1}{2}$  miles off the north part of Pulo Tingi lie Gebang rocks. In fine weather these rocks are visible at low water spring tides; and there are heavy breakers on them in the north-east monsoon. South-westward of the Gebang rocks is Siam knoll of 3 fathoms, lying about one mile off the north-west part of Tingi.

**Morau rocks**, or Arethusa reef, is charted as a reef about half a mile in extent, with a small islet on its western side, about midway between Morau point and Tingi island; it is apparently steep-to.

Lat.  $2^{\circ} 10' N.$   
Long.  $104^{\circ} 2' E.$

Lat.  $2^{\circ} 18' N.$   
Long.  $104^{\circ} 1' E.$

Chart. 2,041  
[2,523].  
Var. 2° E.

**Babi, or High island**, lying 9 miles north-west from Pulo Tingi, is  $2\frac{1}{2}$  miles in length, and three-quarters of a mile in breadth. Near its south end are two peaks, the northern of which is 911 feet high; some rocks lie close to its southern shore. Middle Babi, an island about half a mile in extent, with high rocks close to, lies nearly  $1\frac{1}{2}$  miles north-westward of Babi, and three-quarters of a mile beyond, in the same direction, is North Babi.

Regular depths were found between Babi island and the mainland, there being  $8\frac{1}{2}$  fathoms, mud, in mid-channel, decreasing gradually on either side to 5 fathoms, sandy bottom.

**Water**.—There are three springs of clear fresh water on Babi island, the principal one being on the north-west point of the island, southward of a small patch of mangrove jungle.

Lat.  $2^{\circ} 26' N.$   
Long.  $104^{\circ} 2' E.$

**Tikus rock**, above water, with detached rocks around it, lies  $3\frac{1}{2}$  miles eastward from the southern part of Babi.

**Sakit Mata** is a rock awash, lying E.  $\frac{1}{4}$  N., distant nearly  $2\frac{1}{2}$  miles from the north point of Babi.

**Rawa** is an island, about half a mile in extent, lying  $2\frac{1}{4}$  miles north-east from North Babi. From Rawa a chain of islets and rocks extends 3 miles north-westward, terminating in Gurong islet.

**Siribuat islands**, situated 7 miles north-north-westward from Gurong, consist of two islands, the eastern and larger being about  $1\frac{3}{4}$  miles in extent. The western island, 748 feet high, is less than half the extent of the eastern. These islands are connected by a reef, upon which are some islets and rocks. Off the north-east part of the eastern island are the two Santu islets.

The four Mirtang islands, connected by a reef, lie nearly 2 miles southward of the western Siribuat island.

Lat.  $2^{\circ} 33' N.$   
Long.  $103^{\circ} 46' N.$

**BLAIR HARBOUR**.—Kaban island,  $1\frac{1}{4}$  miles in length and half a mile in breadth, lies near the mainland, abreast the Siribuat islands, and with a prominent point of the coast named Peniabong, about a mile distant, forms Blair harbour.

The harbour is safe, sheltered from the prevailing winds, with anchorage in 4 fathoms, stiff mud. It is easy of access by passing between the north point of Kaban and the Tonos rocks, where the depths are 6 and 7 fathoms, decreasing to 5 and 4 fathoms within.

**Rocks**.—About a mile south-eastward of the south entrance of the harbour, lies Gading rock above water with sunken rocks around; rocks also appear to extend from the points on both sides of the south entrance, thus materially contracting the channel. Little Kaban lies about a mile northward of Peniabong point on the edge of the shore reef; other islets

and rocks lie within it. North-westward of Kaban is a group of islets and rocks named Tonos, and in the same direction, distant 2 miles from Kaban, is Leiar islet.

A rock which uncovers, with 4 to 5 fathoms around, lies about half a mile south of Leiar islet.

**Water.**—Plenty of fresh water may be procured on Kaban island by digging wells about 30 yards from high-water mark.

**Directions.**—**The Sibu or inner channel**, between the Malay coast and the off-lying islands can be used by keeping along the coast at 3 or 4 miles distance. The depths are 8 to 11 fathoms, usually soft ground in mid-channel, with a few casts of sand in some places about midway between Tingi and the mainland. With a working wind a vessel may borrow towards the mainland, generally to 7 fathoms, and in some places to 6 fathoms; and stand off to 11, 12, and 13 fathoms, except in Sibu channel towards Sibu islands, where the depths decrease suddenly from 9 or 10 fathoms to 3 fathoms on Sibu island reef; in this portion a vessel should tack, when the water has deepened to 8 fathoms, when standing off shore. The channel is safe for use during the day, but in the narrow parts, among the islands, it is prudent to anchor at night, because some of the rocks or islets are very little above water; several vessels have, nevertheless, proceeded through in the night.

**Tides.**—It is high water, full and change, about 20 miles southward of the entrance to the Inner channel, at 9h. 44m.; springs rise 7 feet. Near the Siribuat islands it is high water, at 8h. 50m., and springs rise 9 feet.

In fine and moderate weather, tidal streams will generally be found setting along the coast, but currents predominate when the wind blows strong, running to the southward in the north-east monsoon, and in the opposite direction during the south-west monsoon.

**PULO AOR** (position of summit, *see margin*) is about 3 miles in length, north-west and south-east, by about  $1\frac{1}{2}$  miles in breadth, thickly wooded and apparently steep-to; it has two peaks, the southern and higher being 1,805 feet in height, and the northern 1,521 feet. Pulo Aor is generally adopted as a point of departure by vessels bound to China, and steered for on the return passage. Being formed of two hills, it has the appearance of two islands when viewed at a great distance on a north-east or south-west bearing, and resembles a saddle on a nearer approach. The southernmost peak is dome-shaped, and in clear weather may be seen from a distance of 40 to 50 miles; when midway between Bentan hill, in Singapore strait to the southward, and Pulo Aor, they may be visible together.

Pinang is an islet, covered with trees, lying close off the south-east point of Pulo Aor, and Lang is an islet lying about half a mile from the

Charts, 2,041  
[2,529].  
1,394 [2,683].  
Var. 2° E.

north-west point. Dyang island is separated from the north end of Aor by a narrow channel having about 18 fathoms water in it.

**Anchorage.**—The bay on the south-west side of the island affords shelter during the north-east monsoon, when the wind is between North and E.S.E.

A good position is with Lung island in line with the north-west point, in 20 to 15 fathoms, sandy bottom, about half a mile off shore; the bank is steep within a depth of 20 fathoms, and therefore it would be imprudent to shoal under that depth in a large vessel.

**Supplies.**—Pulo Aor is inhabited, and there are numerous huts around the bay; firewood and cocoanuts may be procured, but no other supplies, except water. Vessels procure water with their own boats from a small stream on the north shore of the bay; the natives are generally found to be inoffensive.

**Tides.**—There is a rise and fall of tide about 5 or 6 feet, although the current, due to the monsoon, is met with in the offing.

**Pulo Pemangil**, lies 12 miles north-westward from Pulo Aor, like that island it has two peaks situated in a north-west and south-east direction from each other, the southern peak being 1,507 feet, and the northern 1,227 feet in height. The bay on its south-west side is similar to that on the south-west side of Aor, and affords anchorage in a depth of 18 to 19 fathoms, one mile off shore. There are no supplies here.

Lat. 2° 34' N.  
Long. 104° 18' E.

\*Lat. 2° 46' N.  
Long. 104° 8' E.

**PULO TIOMAN**, situated about 24 miles north-westward from Pulo Aor, is 11 miles in length, north and south, and from 2 to 6 miles in breadth. This island is composed of lofty mountains, the highest of which attains an elevation of 3,444 feet, and may be discerned from 55 to 60 miles in clear weather.\* On its south end are two remarkable peaks, named from their aspect Chula Naga, or Ass's Ears, standing on one base and rising almost perpendicularly from the sea to heights of 2,525 and 2,294 feet.

Pulo Tioman forms part of the British Protectorate of Pahang, and the island is visited by the district magistrate from Pahang river about once a month. The population of the island is about 500, chiefly Malays. A trade in cocoanuts, copra, and sharks' fins is carried on with Singapore; the exports amount to about \$6,000 annually.

Lat. 2° 48' N.  
Long. 104° 12' E.

**Joara bay**, about a mile wide and three-quarters of a mile deep, situated about the middle part of the east side of Pulo Tioman forms a fairly well sheltered anchorage during the south-west monsoon, with depths of 6 to 10 fathoms over an even sandy bottom; the best anchorage is in the south-west part of the bay. Some small islets, 5 to 15 feet in

height, lie off the north-east point of the bay to the distance of  $1\frac{2}{3}$  cables close round which the depth is 10 fathoms.

Charts, 2,041  
[2,529].  
1,394 [2,683].  
Var.  $\frac{2}{3}$  E.

About 200 natives reside in huts along the beach, where there are numerous cocoanut trees; elsewhere it is dense impenetrable jungle. The best landing place is at the mouth of the fresh water stream in the south-west corner of the bay, which can be ascended by a small boat at high water for a distance of 2 or 3 cables. A small supply of cocoanuts, bananas, and fowls can be obtained. There is also good landing within the mouth of the northern stream (fresh water) at this season.

**Anchorages.**—There is a village on the south-east side of the island, in a small sandy bay (Mokut bay), which affords anchorage in 20 to 22 fathoms, sand, and may be used during fine weather; but Nipah bay on the south-west side of the island affords the best shelter in the north-east monsoon. If intending to anchor here, when coming from the northward, pass close round the north-west end of Tioman, between it and the small islands, the passage being  $2\frac{1}{2}$  miles wide, with depths of 20 to 24 fathoms. Keeping about  $1\frac{1}{2}$  or 2 miles from the western shore of Tioman, the water will shoal gradually in the bay to 10 or 9 fathoms, sand and gravel; the best berth is in a depth of 15 or 16 fathoms, with the extremes of the bay bearing E.S.E. and N.N.W., and the middle of the sandy bay N.N.E.  $\frac{1}{2}$  E.

Lat.  $2^{\circ} 41' N.$   
Long.  $104^{\circ} 7\frac{1}{2}' E.$

There is a deep bay on the north-west side of Pulo Tioman, which is reported by the natives to be clear of danger.

**Water.—Wood.**—There are two streams of fresh water in Nipah bay where boats can fill their water casks, but a bar at the entrance of the southern one prevents their going in and out at low water. Firewood may be procured in abundance near the shore. Other supplies are not to be obtained here, the bay seldom being inhabited, although several parts of the island are cultivated.

There is also a stream of fresh water at the south end of Pulo Tioman at the foot of the Ass's Ears, and three streams in Joara bay, above-mentioned.

**Tides.**—It is high water, full and change, at Tioman, at 6h.; springs rise 7 or 8 feet; along the west side of the island the flood stream sets to the northward, and the ebb to the southward, from one to  $1\frac{1}{2}$  miles per hour at times.

**Islets and rocks near Tioman.**—At 3 miles south of the Ass's Ears is Giit islet, having a high rock close southward of it.

Lat.  $2^{\circ} 40' N.$   
Long.  $104^{\circ} 9\frac{1}{2}' E.$

Bara and Burong are two rocks, or small islets, lying in the fairway of the channel between Tioman and Siribuat islands. Bara lies 6 miles westward of Giit, and has sunken rocks extending nearly half a mile northward of it. Burong is distant 10 miles north-westward from Bara,

Charts, 2,041  
[2,529].  
1,394 [2,683].  
Var. 1 $\frac{1}{2}$ ° E.

and the same distance westward of Tioman; close to the eastward of Burong are some rocks above water.

Tolie is the largest of the islands off the north-west point of Tioman, from which it is distant nearly 3 miles. This island is about a mile in extent, having rocks above and below water extending about a mile southward of it. On the western side of Tolie there is a small bay where anchorage may be had in a depth of 10 fathoms, coral and sand; a reef appears to project about 2 cables from the southern point of the bay. The channel between Tolie and the north-west point of Tioman has depths of 22 to 24 fathoms.

A little more than a mile to the northward of Tolie is Chibeh islet; and from 2 to 3 miles westward of Tolie are Sepoi and Labas islets, with rocks extending a short distance to the eastward of the latter.

**The COAST** from abreast Blair harbour trends westward for 7 miles to Endau river, and thence about north-west to the entrance of Pontean river 9 miles beyond; here it gradually assumes a more northerly direction as far as the entrance of the Pahang river, 47 miles northward of the Pontean.

The coast as far westward as Pontean river is fronted by a shallow bank to the distance of 2 to 3 miles, with Boyah rock, awash, at the latter distance.

Lat. 2° 40' N.  
Long. 103° 37' E.

**Endau river** is fronted by a bar extending apparently 1 $\frac{1}{2}$  miles seaward of its entrance points, and by a bank with less than 3 fathoms to about 2 $\frac{1}{2}$  miles off shore. The colonial steam-vessel *Pluto*, October, 1874, when crossing the bar of this river at high water obtained depths of not less than 15 feet, the rise and fall being about 9 feet. No later information is at hand regarding it.

The average depths for a distance of 34 miles up the river are 5 to 6 fathoms. Both banks of the Endau are thickly wooded, and during the rainy season the right bank is generally submerged (H.M.S. *Charybdis*, 1874).

**Boyah rock.**—Two small islets, named Duchong, lie on the shore bank nearly a mile off the coast and 3 miles southward of Pontean river. About 3 miles eastward of them is Boyah rock, awash, with 4 to 5 fathoms water around, with the entrance of Pontean river bearing W.  $\frac{1}{4}$  N., distant 5 $\frac{1}{2}$  miles.

Lat. 2° 49' N.  
Long. 103° 28' E.

**Rumpin river** enters the sea about 13 miles north-westward of Endau river. Its entrance is obstructed by an islet, with shallow water extending one mile seaward of it, the extreme of which is marked by beacons. The channel on either side of the islet has low water depths of 7 to 10 feet; springs rise about 6 feet. These depths are not to be relied on, and the bar is not usually passable during the north-east monsoon period; see remarks, page 350. Within the river the water is deeper for

General chart, 1,355 [2,513].

at least 7 miles, and the natives state that a steam launch could ascend to the distance of about 150 miles.

A flagstaff, police station, and the Collector's house are situated on the north point of entrance.

**Margaret shoal.**—The brig *Margaret*, in working to the northward along the coast in January, 1827, shoaled suddenly from 6 to 4 fathoms and then to 3 fathoms, at about 3 miles off shore, and 9 miles northward of the entrance of Rumpin river. There was a heavy swell on, and the water was breaking at half a cable inshore of this position. From the depth of 3 fathoms the two conspicuous little hills on the low land, of regular form, bore W. by S., and S.W. by W., the trees close to the beach being then visible from the deck. Between the shoal and the shore there appeared to be deeper water.

**PULO VARELLA, or BERHALA**, 92 feet in height, lying 15 or 16 miles from the mainland, is an islet about 300 yards in circumference, with steep sides and covered with trees, and in clear weather may be discerned from a distance of about 15 miles. There is a ledge of rocks about 3 feet high, over which the sea breaks in bad weather,  $3\frac{1}{2}$  cables N. by E. from Pulo Varella.

At about 4 miles North of the island is the west end of a rocky bank with overfalls, which extends thence some 6 miles in an E. by N. direction, with a breadth of about one mile; the depth upon it appears to be about 5 fathoms throughout.

A bank with a least known depth of 6 fathoms and steep-to, lies with Pulo Varella bearing W.  $\frac{1}{2}$  S. distant about 9 miles. There are depths of 13 to 14 fathoms, sand and mud, between it and the islet.

The channel between Varella and the mainland is considered safe; for although the bottom is hard sand in some places, the depths are generally regular, about 11 or 12 fathoms near the island and the rock to the northward of it, shoaling gradually towards the main. Depths of 6 fathoms, and of 5 fathoms, are charted as existing, respectively, W.  $\frac{3}{8}$  S. 7 miles, and W.N.W. 9 miles from Pulo Varella.

**PAHANG RIVER**, the entrance to which is about 20 miles N.W.  $\frac{1}{2}$  N. of Pulo Varella, was formerly a place of considerable trade. The state of Pahang was taken under British Protection in 1888 and has some trade, principally in gold and tin; trade has fallen off of late years owing to steamers not crossing the bar, upon which two have been wrecked. Small steamers run regularly from Singapore to Pahang and the Kuantan river to the northward.

The river is about half a mile wide between its entrance points. Just within is the island of Pulo Tejah, which divides the river into two channels.

Charts, 1,855  
[2,518].  
1,304 [2,683].  
Var. 1° E.

The river is very shallow and boats drawing 3 feet (except at high water) have difficulty in getting to Pékan the capital, a town of 5,000 inhabitants about 7 or 8 miles from its mouth; the district magistrate resides at Pékan.

The bar is not often passable during the north-east monsoon.

**Bar.**—A shallow flat fronts the river mouth to the distance of three-quarters of a mile, over which there is a depth of about 5 feet at low water. This depth is liable to change, and therefore not to be relied on. Spring-tides rise about 8 feet. On the north entrance point is a flagstaff and the quarters of the Collector.

**Wreck.**—A wrecked steamer was on the bar in 1902, lying, E. by N.  $\frac{1}{4}$  N.  $7\frac{1}{2}$  cables from the lighthouse. The wreck, just awash at low water and dangerous for boats, had a green buoy moored on its southern side.

Lat.  $5^{\circ} 32' N.$   
Long.  $103^{\circ} 27' E.$

**LIGHT.**—A *fixed white* light is exhibited at the north entrance point to the river, from a wooden tower 33 feet high, painted in black and white bands, at an elevation of 37 feet above high water, which is visible in clear weather from a distance of 8 miles.

The lighthouse being amongst trees is difficult to make out by vessels approaching in the afternoon, with the sun shining ahead.

**Anchorage.**—There is anchorage during the south-west monsoon, outside the bar in a depth of about 6 or 7 fathoms, with the lighthouse bearing S.W. by W.  $\frac{1}{2}$  W., distant about  $1\frac{1}{2}$  miles. A black and a red buoy occasionally mark the fairway over the bar, but they are not to be depended on.

**Supplies.**—Poultry and fruit are obtainable.

**The COAST** between Pahang river and the Kuantan river, about 18 miles to the northward, forms a bay, which has not been examined, but the chart shows depths of 8 to 9 fathoms on the line joining the entrances of the rivers. Galian hill lies within Tanjung Temiling the north point of entrance to the Kuantan. From this river the coast, which has not been surveyed, trends north-eastward about 18 miles to Tanjong Kuantan, a high and salient point. Within this point is Bukit Tenga.

This coast is in general considered safe to approach to depths of 8 or 10 fathoms; but there are frequently overfalls on ridges of uneven bottom lying parallel to the coast; and there are some spots of 7 or 8 fathoms, sand and gravel, with 9 fathoms nearer the coast. A bank with 6 and 7 fathoms on it, about 20 miles eastward of Kuantan river, lies from 26 to 30 miles N.  $\frac{1}{4}$  E. from Pulo Varella.

A chain of mountains commences inland, nearly abreast Kuantan river, which converges towards the coast near Tanjong Kuantan, and thence extends along it to the northward.

**KUANTAN RIVER** is situated about 18 miles northward of the Charts, 1,355  
[2,513].  
1,394 [2,683].  
Lat. 3° 50' N.  
Long. 108° 20' E.  
Var. 14° E. Pahang, and nearly 2 miles within the high point of Tanjong Temiling. Between the river and the point a bank with less than 6 feet water stretches 1½ miles to the southward, the outer part of which is marked by a group of stakes 4 cables within its extreme, and a buoy, painted black, on its seaward side. Southward of this lies the bar, upon which there is a depth of about 6 to 8 feet at low water, with a spring rise of about 8 feet. These depths are not to be depended on, and the point of the bank is extending southwards. Small steamers run regularly from Singapore to Pahang and Kuantan rivers; most of the small rivers on this coast are not navigable in the north-east monsoon period.

Steam vessels of 7 feet draught navigate to Datu Sawa some 15 miles up, a station of the Pahang Corporation. It is the outlet of a considerable and increasing tin-mining industry.

There are a few huts on the south point of entrance to the river and the fishing village of Kuantan is situated on the north bank about a mile within it.

**LIGHTS.—Beacons.**—Two pairs of shore beacons, all painted white, mark the approach to Kuantan river, the fore beacon in each case being square, and the back (at a greater elevation) rectangular in shape. The outer marks, 581 feet apart (with their upper sides 19 and 44 feet above high water), were in line by latest information when bearing N. 40° W.; they lead clear of the eastern spit. The inner marks (21 and 43 feet above high water) are in line when bearing N. 14° W., and lead up the channel between the banks. The beacons are moved as the channel changes.

At night, during the south-west monsoon, a *white* light is exhibited at each of these marks; in the north-east monsoon, the lights at the inner pair of beacons only are shown.

The depth on the bar at night is indicated by a coloured light at the entrance of the river, thus:—

White light indicates a depth of 8 feet or less.

Green        "        "        8 to 9 feet.

Red        "        "        9 to 10 feet.

White        "        "        10 to 11 feet.

**Kumama river** is situated about 7½ miles northward of Tanjong Lat. 4° 13' N.  
Long. 108° 23' E. Kuantan, and has some trade; vessels drawing 8 feet water enter the river.

**TANJONG PANUNYUT**, formerly known as cape South, is situated 15 miles northward of Tanjong Kuantan, with several small bays and islets or rocks near the coast between, off which there are depths apparently of 5 to 6 fathoms at a short distance. A rocky islet lies close to the point, and some huts are situated northward of the point.

Chart. 1,355  
[2,513].  
Var. 1<sup>1/2</sup> R.

**Howard shoal**, with a depth of  $2\frac{1}{2}$  fathoms, rocky bottom, is said to lie about 6 miles S.E. of Tanjong Panunyut; less water may exist as, in 1823, the Malay fishermen stated there was only one fathom on its centre. Its position, as charted, is doubtful.

The coast from Tanjong Panunyut trends northward for about 27 miles to a rocky point known as Tanjong Dungun, forming three bays, separated by Tanjong Laboha and Tanjong Pelor or Packa, 1,176 and 1,700 feet in height, respectively; a stream discharges close southward of Laboha, and another the Sungi Packa in the bay southward of Tanjong Packa. The Dungun stream lies close southward of Tanjong Dungun. The points of these bays are rocky, but there are depths of 8 to 10 fathoms at from 2 to 3 miles off shore. At the northern end of each of the bays there is a village.

Lat.  $4^{\circ} 50' N.$   
Long.  $103^{\circ} 42' E.$

**Pulo Brala**, distant about 15 miles from the mainland, is about  $1\frac{1}{2}$  miles in length, and 930 feet in height, and may be seen about 30 miles off in clear weather; when it bears about South its summit is flat, but appears in hummocks when bearing to the south-west and westward. A black rock or islet lies one mile southward from its southern extreme. Also an islet about 3 cables in length lies about 2 miles N.N.W. of the island, with three islets or rocks about a mile beyond; they are all apparently steep-to.

Between this island and the mainland the depths are irregular in some places, and the bottom rocky, or sandy; but in other places regular depths of 15 to 19 fathoms are found over a bottom of mud.

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General chart, 2,414 [2,682].

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## ● CHAPTER IV.

### MAIN ROUTE TO CHINA.—DESCRIPTION OF ISLANDS, REEFS, AND SHOALS.

Directions for making the passage by the Main route to and from China are given in Chapter I.; a description of the islands and shoals in this route will now be given.

#### EASTERN SIDE OF MAIN ROUTE.

**Caution.**—Vessels should not attempt to pass eastward of the var.  $2^{\circ}$  E. banks that are here described, as numerous shoals exist over a very large area which have not been correctly charted.

**Currents and Tides.**—Whilst H.M.S. surveying vessel *Riflemen* was at anchor on the reefs, during both monsoons, careful observations were taken of the set of the current *on* the reefs, which, for sixteen hours out of the twenty-four, invariably set to windward, generally with the greatest force when the monsoon was strongest.

The rise of tide at springs was about 5 feet, and at neaps one to 2 feet; one tidal stream in the twenty-four hours.

**CHARLOTTE BANK**, with depths of 5 to 6 fathoms, and Lat.  $7^{\circ} 7' N.$  Long.  $107^{\circ} 36' E.$  40 fathoms close around, is  $3\frac{1}{2}$  miles in length east and west, and 2 miles in breadth.

When near the parallel of this bank a vessel will pass westward of it by keeping in less than 30 fathoms water.

A doubtful shoal,  $7\frac{1}{2}$  fathoms, marked *Scaufell*, 1865, on the chart, lies 47 miles W. by N. of Charlotte bank; described on page 117.

**VANGUARD BANK**, having 9 fathoms least water, and Lat.  $7^{\circ} 30' N.$  Long.  $109^{\circ} 57' E.$  general depths of 20 to 60 fathoms, is crescent shaped, about 34 miles in length, and has an average breadth of 6 miles. The position of its eastern end is given in the margin.

**Grainger bank**, the centre of which lies 35 miles N.E. by E.  $\frac{1}{4}$  E. from the east end of the Vanguard, is  $5\frac{1}{2}$  miles in length by 2 miles in breadth. There are coral heads with 6 to 8 fathoms over them and depths of 10 to 20 fathoms around; the coral bottom is visible over nearly the whole of it.

Var. 2° E.

**PRINCE CONSORT BANK** lies between the Vanguard and the Prince of Wales bank, and extends from lat. 7° 46' N. to 7° 58' N., and from long. 109° 55' E. to 110° 6' E. No danger exists on it; the general depths are from 30 to 50 fathoms, sand and coral, the least water found being on some coral heads near the western edge with depths of 10 to 13 fathoms.

\*Lat. 8° 8' N.  
Long. 110° 27' E.

**Prince of Wales bank**, from 22 to 34 miles east-north-eastward of Prince Consort bank, is 12 miles in extent north-east and south-west, and 7 miles in breadth; it is of coral formation with irregular depths, there being several heads with depths of 8 to 10 fathoms, and one of 4 fathoms\* near its north-west corner.

**Alexandra bank**, about 5 miles south-eastward of Prince of Wales bank, is 5 miles in length north and south, and 3½ miles in breadth. A patch, with 3 fathoms lies near the eastern edge, and there are others with 6 to 7 fathoms; the general depth is about 15 fathoms, the bottom, coral, distinctly visible.

**RIFLEMAN BANK** is about 30 miles in length in a north and south direction by about 13 miles in breadth. Shallow patches, varying from 1½ to 7 fathoms exist around the edges, within which are depths of 20 to 40 fathoms, sand and coral; around the bank are depths of 300 to 600 fathoms.

Lat. 7° 56' N.  
Long. 111° 42' E.

**Bombay Castle shoal**, with 1½ fathoms, situated at the north end of the bank, is marked by heavy breakers except during the finest weather.

Bombay Castle, Orleans, Johnson and Kingston shoals, of former charts, were found by Commander Ward of H.M.S. *Riflemen* to be patches on the edges of Rifleman bank and are named accordingly. It is quite possible that other small shoal patches may exist on the bank.

Lat. 8° 8' N.  
Long. 111° 39' E.

**Owen shoal**, reported in 1835, to be about two miles in extent and to have a depth of 3½ fathoms, over coral, is charted 22 miles north-eastward of Rifleman bank. It has not been examined.

Lat. 7° 51' N.  
Long. 112° 55' E.

**Amboyna cay**, situated at the south-west extreme of a small coral bank, is 150 yards in extent, and 8 feet high. It is surrounded by coral ledges, partly dry at low water, and steep-to, to the distance of nearly 2 cables in places, upon which the sea breaks heavily with any swell.

A pile beacon, composed of drift wood collected on the cay, a few lumps of coral, &c., was erected in the centre of the island, and possibly still exists.

**A bank**, 2 cables wide, extends about one mile north-eastward of the cay, with a depth of 4 fathoms at about a third of a mile from it; at the extreme of the bank the water deepens suddenly from 9 to 17 fathoms and thence to deep water.

General charts, 2,660a, b [2,678, 2,679].

**Anchorage** on this bank was obtained by the *Riflemen*, in 5 fathoms Var.  $2^{\circ}$  E. in the south-west monsoon, fairly sheltered by the cay from the prevailing wind.

A reef with a depth of 2 to  $2\frac{1}{2}$  fathoms was reported by H.M.S. *Wanderer* in 1889, to lie with the centre of Amboyna cay bearing S.E., distant from half to one mile.

**Tides.**—By observations at Amboyna cay two days before neaps, the maximum rate of the tidal stream was 1·4 knots per hour, the flood stream setting about N. by W., the ebb West; flood commencing at 11 p.m., and the ebb at 6 a.m.; rise and fall doubtful.

Remains of huts, which had been made of stones, pieces of coral, planks and bamboos, parts of an old boat, &c., were seen on the cay (1889), all covered with a white coating of guano, denoting that it is a long time since anyone was working guano, or living on Amboyna cay.

**Stags shoal** was reported in 1802 as consisting of rocks showing Lat.  $8^{\circ} 24' N.$  Long.  $112^{\circ} 57' E.$  above water.

The *Riflemen* in 1868, obtained 1,085 fathoms, ooze, in the position assigned to Stags shoal. Commander Ward, R.N., of that vessel, found Amboyna cay to be 11 miles further west than reported by Mr. Trinder, commanding the *Amboyna*, who discovered both dangers; and it is possible, therefore, that the position of the Stags given may be 11 or 12 miles eastward of the truth. H.M.S. *Renard* got upon the position ascribed to the Stags shoal, and steered a few miles East and West, but could not discover it.

**Ladd reef**, the position of the eastern extreme of which is given Lat.  $8^{\circ} 39' N.$  Long.  $111^{\circ} 40' E.$  in the margin, is a coral reef 3 miles in length, east and west, and about one mile in breadth. In the centre of the reef is a lagoon with a bottom of white sand. The surrounding reef uncovers at half tide in many places, and at low water it is almost impossible for boats to cross over into the lagoon.

**Spratly (or Storm) island**, situated 14 miles E.  $\frac{1}{2}$  S. from Ladd reef, is a bare flat island about 8 feet high,  $2\frac{1}{2}$  cables in length, and  $1\frac{1}{2}$  cables in breadth, with a margin of bright white sand and broken coral. At a distance of 3 or 4 miles, in the breeding season, the birds standing erect look like small bushes.

The island is on the west end of a coral bank, which is  $1\frac{1}{2}$  miles in length by 7 cables in breadth. Northward of the island at three-quarters of a mile distant, there is a depth of  $3\frac{1}{2}$  fathoms close to the edge of the bank, decreasing towards the shore. North-eastward the depth is 7 or 8 fathoms not quite half a mile from the island. Rocky ledges, dry at low water, surround the island, requiring caution when landing, which during the south-west monsoon may be effected on the lee side. The bank is steep-to, the sea breaking heavily upon it, except in very fine weather.

Var. 2° E.

Lat. 8° 38' N.

Long. 111° 55' E.

The *Riflemen* anchored in about 6 fathoms on the north-east point of the bank, fairly sheltered from the south-west; with the extremes of the island bearing S.W.  $\frac{1}{2}$  S., and S.W. by W.  $\frac{1}{2}$  W., and the extreme of the breakers on the western edge, W.  $\frac{3}{4}$  S.

In the months of June and July turtle frequent the island, and they may possibly do so at other seasons. Numbers were taken on the beach, being easily turned over by two or three men. Quantities of their eggs were found on the south-west side of the island. Sea birds' eggs covered the ground in the months mentioned.

There were no signs in 1889 of anyone ever having tried to live there.

**Tides.**—Observations at Spratly island in the summer months showed but one tide during the 24 hours, and in the early part of July it was found to be high water at 9h. a.m., the rise and fall being  $5\frac{1}{2}$  feet. The direction of the stream at the north-east corner of the bank was S.W. during the rising tide, and S.E. to E.N.E. during the falling tide.

**LONDON REEFS.**—The London reefs, four in number, lie north-eastward of Spratly island and extend over a distance of about 38 miles in an east and west direction, and are steep-to.

Like most dangers in the China sea, the London reefs are surrounded by deep water, thus rendering the lead useless; great caution is therefore necessary when navigating in the vicinity of these reefs, and vessels should not stand towards them with the sun shining ahead, as under these circumstances it becomes almost impossible to distinguish shoal water or breakers.

Lat. 8° 50' N.  
Long. 112° 11' E.

**West London reef** is about 4 miles in extent with several detached coral heads dry at low water around its edge. In the centre of the reef there are depths of 6 to 10 fathoms, with several coral heads. The only approach to the centre is from the south-east side, but so many coral patches exist that the navigation is hazardous. On the east side of the reef is a sand cay, 2 feet high.

Lat. 8° 55' N.  
Long. 112° 21' E.

**Central reef**, is a coral patch awash, half a mile in extent, with a shallow lagoon within the belt of coral. On the south-west extreme of the reef is a sand bank, probably covered at high-water springs.

This reef lies directly in the track of vessels working up or down the China sea. It is not always marked by breakers, like those which so readily point out the positions of East and West London reefs.

Lat. 8° 49' N.  
Long. 112° 37' E.

**East London reef** is 7 miles in length, east and west, and from one to two miles in breadth. The coral around its edges encloses a lagoon, having depths of 4 to 8 fathoms with many rocky heads; no entrance into the lagoon was discovered. The sea breaks heavily on the reef, and on its western extreme are one or two rocks which seldom cover.

**Cuarteron reef**, the easternmost of the London reefs, is awash, Chart, 1,201 [2,718]. crescent-shaped, about 3 miles in length, and very steep-to. Although deep water is found close to all of these reefs, there was generally some slope from the edges, on which the *Riflemen* could anchor with safety for a short period, to enable the position to be fixed, but on Cuarteron reef no anchorage could be found, it being "steep-to" all round.

**The FIERY CROSS or N.W. Investigator reef** is a coral reef having several dry patches, upon most of which the sea breaks even in light winds, or with a slight swell. It is 14 miles in length, north-east and south-west, and 4 miles in breadth. The largest dry patch is at Lat.  $9^{\circ} 32' N.$ , Long.  $112^{\circ} 24' E.$  its south-west end.\*

Dhaalle reef, reported in 1826 to exist in the marginal position, is Lat.  $9^{\circ} 32' N.$ , Long.  $112^{\circ} 24' E.$  considered to be identical with one of the neighbouring reefs. In this locality a depth of 1,060 fathoms is charted.

**Discovery Great reef**, the south point of which is N.E. by E.  $\frac{1}{4}$  E., Lat.  $10^{\circ} 1' N.$ , Long.  $113^{\circ} 51' E.$  distant 55 miles from Fiery Cross reef, is a narrow coral reef, about 7 miles in length, the greater part of which dries at low water, but with several large rocks always showing; in the centre is a lagoon, which appeared to be shallow, and to have no passage leading into it. No bottom was found with 100 fathoms line within a short distance of any part of the reef, except off its north end, where the *Riflemen* anchored in 42 fathoms nearly half a mile from the rocks.

The Hainan fishermen reported a reef or shoal lying 10 miles north-eastward of Discovery Great reef, but that locality, not having been examined, should be avoided.

**Discovery Small reef**, lying about 10 miles eastward from the south point of Discovery Great reef, is a round coral patch, a third of a mile in diameter, dry in places at low water, with very deep water all round.

**Western or Flora Temple reef** is the westernmost reef in this part of the China sea, and dangerous, having patches of rock just under water at the south-west part, and from one to 3 fathoms in other places. It is a narrow reef  $1\frac{1}{2}$  miles in length, north-east and south-west, with depths of 20 to 70 fathoms close-to.

**TIZARD BANK, with REEFS and ISLANDS.**—Tizard bank lies about 16 miles north-eastward of Discovery Small reef. It, like the generality of the large coral banks in the China sea, consists of a lagoon bordered by reefs dry at low water, two with islands on them, and a third with a sand cay. The bank is about 30 miles in length in an east and west direction, with an average breadth of about 8 miles. In the lagoon are several coral heads of 5 to 6 fathoms. The tops of the few trees on the islands may possibly be seen from a distance of 8 to 10 miles.

General chart, 2,680b [2,679].

Chart, 1,201  
[2,718].  
Var. 2° R.

Hainan fishermen, who subsist by collecting trepang and tortoise-shell, were found upon most of these islands, some of them remain for years amongst the reefs. Junks from Hainan annually visit the islands and reefs of the China sea with supplies of rice and other necessaries, for which the fishermen give trepang and other articles in exchange; the junks leave Hainan in December or January, and return with the first of the south-west monsoon. The fishermen upon Itu Aba island were more comfortably established than the others, and the water found in the well on that island was better than elsewhere.

Lat. 10° 23' N.  
Long. 114° 22' E.

**Itu Aba**, the larger of the two islands, lies at the north-west corner of the bank, and is three-quarters of a mile in length. The reef surrounding it extends in some places nearly half a mile, its limits being generally defined by a line of breakers. The island is covered with small trees and bushes, and there are a few cocoanut and plantain trees near a well, the tops of which are about 25 feet above the sea.

**Sand cay**.—About 6 miles eastward of Itu Aba island is a sand cay, near the centre of a round reef three-quarters of a mile in diameter. This cay which was a mere patch of sand when visited by the *Riflemen* in 1867 had bushes on it about 9 feet high; when seen from H.M.S. *Rambler* in 1888, their tops were about 15 feet above high water.

The island and cay are connected by a line of shallow patches; nearly midway between is a reef about 7 cables in diameter, covered at high tide. Elsewhere on the northern edge of the bank there is a depth of not less than 4 fathoms, and vessels may safely anchor in 7 to 10 fathoms about midway between the sand cay and the reef last described.

**Petley reef**, an oval-shaped patch about a mile in extent, forms the extremity of a ledge of coral,  $1\frac{1}{4}$  miles wide, projecting in a northerly direction from the north side of the bank. Not less than 6 fathoms was found upon the strip, except within two miles of Petley reef, where a central ridge shoals to 2 fathoms; no bottom could be obtained with 100 fathoms at a short distance on either side of the ledge.

Lat. 10° 23' N.  
Long. 114° 42' E.

**Eldad reef** forms the eastern extreme of Tizard bank. It is  $4\frac{1}{2}$  miles in length, from a cable to nearly a mile in breadth, and steep-to on its north and south sides; a spit, about one mile in length, extends north-eastward of the reef, with depths increasing suddenly from 8 to 100 fathoms. A few large rocks on the reef are always visible, and at low water many smaller ones uncover.

Lat. 10° 13' N.  
Long. 114° 13' E.

**Nam yit island**, on the south-west side of Tizard bank, is 3 cables in length by one cable in breadth, and surrounded by a reef which projects more than a mile to the westward, and about a third of a mile in other directions. It is about 20 feet in height and covered with small trees and bushes.

**Gaven reefs**, two in number, form the south-west extreme of Tizard bank; they are each about one mile in extent, covered at high water and about  $2\frac{1}{2}$  miles apart, with coral heads between.

Chart, 1,201  
[2,718]  
Lat.  $10^{\circ} 18' N.$   
Long.  $114^{\circ} 14' E.$   
Var.  $2^{\circ} E.$

**Anchorage.—Directions.**—The above comprise the whole of the dangers found on Tizard bank, and with the exception of a 3-fathoms patch, about a mile north-east of Nam yit, nothing less than 4 fathoms was discovered on any of the shoal patches surrounding the lagoon. Vessels of moderate draught can, therefore, in cases of necessity and in fine weather, find convenient anchorage, observing always due care and caution in approaching them, so as to guard against possible danger from some shoal spot having escaped detection by the lead.

**LOAI TA BANK** extends 21 miles in a north-east and south-west direction, and is 7 miles wide near its middle, tapering towards the ends.

**Loai ta island** lies N.  $\frac{3}{4}$  E., distant 18 miles from Itu Aba island on Tizard bank. It is a sand cay,  $1\frac{1}{2}$  cables in diameter, covered with bushes, and surrounded by a reef extending in some places nearly half a mile.

Lat.  $10^{\circ} 40' N.$   
Long.  $114^{\circ} 25' E.$

A reef,  $1\frac{1}{4}$  miles in extent, dry at low water, with a sand cay near the centre, lies 5 miles north-westward of Loai ta island. Another reef,  $1\frac{3}{4}$  miles in extent, lies three-quarters of a mile to the south-westward of the one just mentioned. Not less than 4 fathoms was found anywhere on the northern edge of Loai ta bank.

**Lan kiam cay and adjacent reefs.**—A coral patch, half a mile in extent, partly dry at low water, lies E. by N.  $\frac{1}{2}$  N. 2 miles from Loai ta island; and N.E. by E.  $\frac{3}{4}$  E.  $6\frac{1}{4}$  miles from the same island is a reef three-quarters of a mile in diameter, having a sand cay near its centre, known to Hainan fishermen as Lan kiam.

At 3 and  $4\frac{1}{2}$  miles north-eastward from Lan kiam, are two coral reefs which dry at low water, forming the south-eastern extreme of Loai ta bank; no shallow reefs were found northward of these, the least depth being 6 fathoms near the northern end.

**THI TU ISLAND and REEFS** consist of several dangerous patches upon two coral banks, 12 miles in length, separated by a narrow and deep channel.

Thi tu is a low sand island, about 4 cables in length, situated on the southern part of the reef which forms the eastern extreme of the western bank. There are a few cocoanut and plantain trees near a small well.

Lat.  $11^{\circ} 3' N.$   
Long.  $114^{\circ} 17' E.$

On the south-west extreme of the island there is a bushy tree (it may not still exist).

The western bank is 7 miles in length with a maximum breadth of  $3\frac{1}{4}$  miles; its north side is marked by a round coral reef, three-quarters

Chart. 1,201  
[2,718].  
Var. 2<sup>o</sup> E.

of a mile in diameter, between which and the island reef are depths of 2½ to 6 fathoms.

A sand cay lies on the north-west edge of the bank, on a reef dry at low water and about 1½ miles in extent; between it and the western extreme of the bank are reefs, nearly always marked by breakers. There is a passage into the lagoon between the sand cay reef and the reef eastward of it, with depths of 5 to 12 fathoms.

The south extreme of the bank is marked by a small reef, situated 2 miles south-westward of the island.

The south side of the bank is not nearly so dangerous as the north side, and vessels may anchor upon it, with the sand cay on the north-west side bearing between N.E. by N. and N.W. by N.; or to the eastward of the small reef on its south extreme, where there is not less than 4 fathoms. In the lagoon the depths are as much as 19 fathoms.

The eastern bank is a mass of reefs and patches 4½ miles in length, with a breadth of 2 miles; its western extreme is about 7 cables eastward of Thi tu island reef.

Lat. 10° 54' N.  
Long. 114° 5' E.

**Subi reef**, the north end of which lies S.W. ¾ W., distant 12½ miles from Thi tu island, is an irregular shaped coral reef, 3½ miles in length by 2 miles in breadth, dry at low water, and has a lagoon, into which there appears to be no passage; it usually breaks and is apparently steep-to.

Lat. 11° 28' N.  
Long. 114° 20' E.

**NORTH DANGER REEF**, of coral formation, is about 8½ miles in length, north-east and south-west, 4½ miles in breadth, and situated from 20 to 28 miles northward of Thi tu islands. On its north-west side are two sand cays, each about half a mile in length; the northern one is 10 feet high and the southern 15 feet. Between the cays is a passage one mile wide, with depths of 3 to 9 fathoms leading into the lagoon of the reef, where the depth is 20 to 25 fathoms.

Shallow water exists all round the edge of North Danger reef, and there are heavy breakers over the coral, awash at its north-east and south-west extremes. No bottom could be obtained close to the edge of the reef with upwards of 100 fathoms of line.

Both cays are covered with coarse grass, and on the north-eastern of the two is a stunted tree. The cays are frequented by Chinese fishermen from Hainan, who collect bêche-de-mer, turtle shell, &c., and supply themselves with water from a well in the centre of the north-easterly cay.

**Trident shoal**, lying 16 miles eastward of North Danger, is composed of coral, and is 7½ miles in length by 6 miles in breadth; there are many patches on this shoal with less than 10 fathoms water over them, two of which are very shallow. The patches lie around the edge of the

shoal, forming a lagoon, the depths in which are 20 to 35 fathoms close outside the shoal there is no bottom at 100 fathoms.

Chart, 1,000  
[2,695].  
Var. 2° E.

The shallowest patch, situated at the northern extreme of the shoal, is about 2 miles in length, east and west, having near its centre\* a spot which dries at low water springs; the depths on other parts of the patch vary from one to 5 fathoms. Another shallow patch lies at the eastern extreme, with a least depth of  $2\frac{1}{2}$  fathoms, and 3 to 5 fathoms at half a mile around it. A depth of 4 fathoms was found on a head about a mile westward of the northern patch, but not less than 5 fathoms on any of the other patches.

**Lys shoal**, about 5 miles in length, lies 2 miles southward of Trident shoal, and like the latter is formed of a number of patches under 10 fathoms, with a lagoon in the centre. A small spot of  $2\frac{1}{2}$  fathoms was found, and this lies near the south-west extreme of the bank; around it the depths are 5 fathoms. Some 5-fathoms patches exist near the north-east end of the bank, but nothing under 6 fathoms was discovered elsewhere; the bank is steep-to.

Lat. 11° 31' N.  
Long. 114° 39' E.

#### WESTERN SIDE OF MAIN ROUTE.

**Scawfell shoal**.—Mr. Thompson, commanding the ship *Scawfell*, states that on the 13th of May, 1865, just before mid-day, while taking noon observations, with smooth water, and a very light north-east wind, he saw the bottom and obtained several soundings, the least being  $7\frac{1}{2}$  fathoms. The vessel was drifting north-north-westward with gradual deepening soundings, 29 fathoms being obtained at about 5 miles from the shoal. Made Pulo Condore next day, and by that island, together with observations taken in Sunda and Gaspar straits, the chronometers appeared to be quite correct.

Lat. 7° 19' N.  
Long. 106° 51' E.

H.M.S. *Egeria*, 1875, and also H.M.S. *Rambler*, 1901, passed over the reported position of Scawfell shoal, without obtaining any indication of shoal water.

**PULO CONDORE GROUP**, named Con-non by the Cochin Chinese, consists of about a dozen islands, situated about 45 miles from the coast of Cambodia, in the track of vessels proceeding between Singapore and Saigon river; they are distant about 100 miles from cape St. James, at the entrance to that river.

Lat. 8° 40' N.  
Long. 106° 34' E.

The principal island is nearly 9 miles in length, north-east and south-west, from 2 to 4 miles in breadth, and is formed of a ridge of mountains the summit being 1,954 feet above high water. The eastern side is divided into two bays by a rocky peninsula, the northern of which is completely open to the eastward; on the western side is South-west bay. Pulo Condore is encompassed by several smaller islands, which are

General charts, 2,660a [2,678], 2,660b [2,679].

Chart, 1,000  
[2,695].  
Var. 2° E.

mostly high and covered with trees, the highest attaining an elevation of 1,076 feet.

**Settlement.—Supplies.**—The French have established a fortified post and a penal settlement at the village in Great or East bay. A small pier fronts the village. The island is but thinly populated, but it furnishes plenty of fruits and abounds with timber. The natives rear a quantity of poultry and pigs. Water is procurable in South-west bay, southward of the landing place. A steamer from Saigon calls once a month.

Lat. 8° 40' N.  
Long. 106° 41 $\frac{1}{4}$  E.

**LIGHT.**—From a rectangular white lighthouse, with red roof, erected on the east end of Hon Bai Kan, is exhibited at an elevation of 696 feet above the sea, a *fixed white* light visible when bearing from N. 58° E., through north and west, to S. 28° E., except where obscured by Hon Kao, between S. 42° W. and S. 58° W.; it can be seen in clear weather from a distance of 25 to 30 miles.

**Great or East bay,** is formed by the projection from the main body of the island of two high points of land, which are about 4 miles apart. It is only available during the south-west monsoon period.

Off the southern point, four islets, fringed with coral, extend nearly 1 $\frac{1}{2}$  miles, and off East point is Hon Bai Kan, an island nearly three miles in length and 1,076 feet in height, also fringed with coral (*see* light above). Hon Lap, a small islet, lies off its south side. Hon Kao, about a mile in extent and 797 feet in height, lies about 2 miles N.E. by E. of Bai Kan.

**Dangers.**—The bay, inside a line connecting its northern and southern points, is encumbered with an extensive shore-flat, and many detached shallow patches, on account of which vessels should not go inside that line except at the south-west part of the bay, where the least known depths are 3 $\frac{1}{2}$  and 3 $\frac{1}{2}$  fathoms.

The main entrance to the bay is barred by a flat which extends right across from Hon Gué to Hon Bai Kan, with depths under 5 fathoms and several patches of 2 to 3 fathoms, as shown on the plan. The deepest water over it is close to Hon Gué.

In the deep-water anchorage between this bar and the shallows off the head of the bay is a patch of 2 $\frac{3}{4}$  fathoms, steep-to, with White rock in line with East point, bearing N.N.E.  $\frac{1}{2}$  E., the latter distant 1 $\frac{6}{5}$  miles. Patches of 4 to 5 fathoms are charted in the southern part of the deep water, and others may exist as the bay has not been thoroughly examined.

A rock, nearly awash, lies one mile S.  $\frac{1}{2}$  E. from the pier at the village, and 4 cables from the western shore, with a remarkable rocky elevation in that direction bearing W.  $\frac{3}{4}$  S.; a buoy with top-mark is moored off its western side.

There are no known dangers in the approach to the Pulo Coudore group.

**Directions.**—Great or East bay has three entrances. That from the south-westward between the south point of the bay and Hon Cha is Chart, 1,000  
[2,695].  
Lat. 8° 17' N.  
Long 106° 42' E. Var.  $2^{\circ}$  E. 3 cables wide, and apparently deep, but the water shoals to less than 5 fathoms within the island.

The second, or the channel from the eastward, is between Hon Gué and Hon Bai Kan, over the bar which connects the two. The best water, about  $4\frac{1}{2}$  to 5 fathoms, will be found by passing from one to 2 cables north-eastward of Hon Gué, about midway between it and the bank with 2 fathoms water to the eastward.

The passage from the north-eastward, between East point and Hon Bai Kan is two-thirds of a mile wide, and deep, but the soundings are very scant in the approach. When within the entrance, by keeping White rock twice its breadth open of East point, a vessel will pass south-eastward of the  $2\frac{1}{2}$ -fathoms patch, mentioned on last page. When the remarkable rock situated on the northern slope of the hills on the south side of the bay bears W.  $\frac{3}{4}$  S. steer for the south point of the bay, anchoring as convenient.

**Anchorage.**—A good berth for a large vessel appears to be in 7 or 8 fathoms, with Hon Tai-leung, the largest islet off the south point of the bay, bearing about South, and Hon Lap from E.  $\frac{1}{2}$  S. to E.  $\frac{1}{2}$  N. During the strength of the south-west monsoon, in order to avoid the sea, vessels of moderate or light draught should anchor farther west, where, however, the squalls are heavier, but the holding ground is good, the bottom being grey mud. There appears to be good anchorage, with depths of  $4\frac{1}{2}$  to  $5\frac{1}{2}$  fathoms, inside the  $3\frac{1}{2}$  and  $3\frac{1}{2}$  fathoms patches, with the south point of the bay bearing from S. by W.  $\frac{1}{2}$  W. to S.  $\frac{1}{2}$  E., and Hon Lap from East to E.  $\frac{1}{2}$  S.

A small craft may enter the inner anchorage by passing southward and westward of the rock nearly awash, and then rounding up to a position S. by W.  $\frac{1}{2}$  W. of the pier, where there is anchorage in  $3\frac{1}{2}$  to 4 fathoms.

**Tides.**—It is high water, full and change, at Pulo Condore, at 2h. 30m.; springs rise  $6\frac{1}{2}$  feet.

**North-east bay** offers convenient shelter in the south-west monsoon for vessels not wishing to enter Great bay. It appears to be free from danger, but the depths decrease sharply within the 5-fathoms line. Vessels should therefore anchor in 7 fathoms, mud, or directly the water shoals under that depth.

**White rock** lies N.E. by E.  $\frac{1}{2}$  E., distant  $3\frac{1}{4}$  miles from the north-east point of the largest island of the Pulo Condore group; it is apparently high, and there are depths of 17 to 22 fathoms at about half a mile off. Lat. 8° 17' N.  
Long 106° 42' E

**SOUTH-WEST BAY** is formed between the south-west end of the large island and the adjoining high island, Little Condore or Bae

Charts, 1,000  
[2,695], 1,261  
[2,697].  
Var. 2° E.

Vioung, 708 feet in height, the east point of which is separated from the south-west point of the large island by a narrow channel. The entrance to the bay is about three-quarters of a mile wide, with depths of 7 to 9 fathoms, gravel and mud, decreasing to 5 fathoms near the flat that occupies the head of the harbour, and which is dry at low water for half a mile. This bay is well sheltered by the surrounding hills, except from the north-westward, but the wind is seldom strong from that quarter; the heavy squalls, however, require precaution, but the holding ground is good.

Some islets lie off the north point of this bay, northward of which is a high island named Hon Trap, having some rocks above and below water extending from its north-west side.

Hon Taé, another high island, lies about a mile to the north-westward of Hon Trap; off its-north-eastern extreme is an islet. Hon Taé Niao is another island lying a little more than 2 miles north-eastward of Hon Taé, having a reef and some rocks extending about a cable from its north side.

**The BROTHERS** are two islets, about three miles apart, north-east and south-west, and situated 24 miles westward of the Pulo Condore group. The westernmost\* is a low barren rock, and has heavy breakers on its eastern side during strong winds. The easternmost is a round islet, 180 feet in height, with trees on its summit.

\*Lat. 8° 34' N.  
Long. 106° 6' E.

**WALLACE BANK** was reported by the Master of the British ship *Wallace* (1885) to be about three-quarters of a mile in extent, with a depth of 8 fathoms.

Lat. 9° 32' N.  
Long. 107° 40' E.

**Royal Bishop bank**, composed of coral, is 3½ miles in length and about 1½ miles in breadth, with a depth of 10 fathoms over it, and 28 to 30 fathoms around; there may be less water.

A patch of 8 fathoms is charted in lat. 10° 2' N., long. 108° 5' E.

Lat. 9° 58' N.  
Long. 109° 6' E.

**PULO SAPATU**, or Shoe island, 347 feet high, is the eastern-most of three islands named the Catwicks. It is a barren rock, one-third of a mile in length, and visible in clear weather from a distance of 22 miles.

When viewed from some directions it resembles a shoe; at others appears as a large square column; and from the eastward as a pyramid. Vessels generally endeavour to sight this island, or to pass within 20 or 25 miles of its eastern side, in proceeding up or down the Main route of the China sea.

With the exception of a rock awash, lying a quarter of a cable eastward of its south end, the island is steep-to; depths of 16 and 17 fathoms were found at 2 cables eastward of it, and at half a mile off in that direction 25 to 30 fathoms. On the west side the depths are greater.

**Landing.**—Under very favourable circumstances landing may be effected upon the rocks at the south end of the island; otherwise it is inaccessible. It is frequented by sea birds in the breeding season.

**Julia shoal**, with a depth of  $2\frac{1}{2}$  fathoms, situated S.E. by E.  $\frac{1}{2}$  E., distant  $3\frac{1}{2}$  miles from Pulo Sapatu, is of coral formation, and about a quarter of a mile in extent.

The Little Catwick well open northward or southward of Pulo Sapatu, leads half a mile or more clear of the shoal. With the Little Catwick shut in behind Pulo Sapatu a vessel will be inside the Julia shoal if the angle of elevation of Pulo Sapatu be  $1^{\circ} 22'$  or upwards, and outside the shoal if the angle of elevation be less than  $0^{\circ} 45'$ .

**The Pyramid, or Little Catwick**, is a pyramidal rock, 56 feet high and steep-to, lying  $2\frac{1}{4}$  miles N.W. by W.  $\frac{1}{2}$  W. from Pulo Sapatu.

The channel between this rock and Pulo Sapatu has a depth of 50 to 60 fathoms, but it ought not to be used by a sailing vessel, as the currents are strong and irregular about these islands.

**Round island, or Great Catwick**, is a barren rock 196 feet high, and about 300 yards in diameter, bearing W.N.W. distant  $11\frac{1}{4}$  miles from Sapatu; it has depths of 30 to 50 fathoms at a short distance in all directions.

**La Paix rock** is small, with a pinnacle awash, lying in the channel between Great and Little Catwick, and which may, with this exception, be considered safe to navigate. From the pinnacle, Great Catwick bears West, about  $4\frac{1}{2}$  miles, and Pulo Sapatu is just open eastward of Little Catwick. Except in fine smooth weather, the sea always breaks upon this rock.

**Yusun shoal** is a coral patch of 4 fathoms, in the fairway of the channel between Pulo Cecir de Mer and the Catwicks, with the western hill of the former bearing N. by W.  $\frac{7}{8}$  W., distant  $17\frac{1}{2}$  miles, and the Great Catwick S.S.W.  $\frac{1}{2}$  W.  $14\frac{1}{2}$  miles. Close around it are depths of 45 to 50 fathoms, which is the general depth of the middle of the channel, but about  $1\frac{1}{2}$  miles W.N.W. of the shoal are depths of 23 and 27 fathoms. In fine weather the shoal is not easily seen, but in the strength of the monsoons the sea has been frequently observed to break upon it.

There is reason to believe that the Yusun is the only danger in the channel between Cecir de Mer and the Catwicks, which is otherwise spacious and safe. The depths in the channel are irregular, and will be better understood by a reference to the chart.

**PULO CECIR DE MER** is  $3\frac{1}{2}$  miles in length north and south, and  $1\frac{1}{2}$  miles in breadth, with two hills towards its north end. The southwest hill\* has a round top, is 360 feet in height, and is visible in clear weather from a distance of about 25 miles. The north-east hill, 306 feet

General chart, 2,660a [2,678].

\*Lat.  $10^{\circ} 28' N.$   
Long.  $108^{\circ} 59' E.$

Chart. 1,261  
[2,697].  
Var. 2<sup>o</sup> E.

high, is conical, and has several masses of rock near its summit, which give it a jagged appearance.

**No supplies.**—Pulo Cecir de Mer is inhabited by poor fishermen and others, and is well cultivated, but no supplies can be obtained.

**Islets and reefs.**—Nearly half a mile off the north-east end of the island are several rocks, one 60 feet high, with foul ground around. Nearly a mile off the north end is a patch of 5 fathoms.

On the east side is a sandy bay, fronted by a coral reef to the distance of a mile or more; the reef is steep-to. At half a mile off the south end is an islet 132 feet in height, with a rock beyond 30 feet in height. The reef which fronts the bay encircles these islets, and extends about 3 cables south-eastward of the last-mentioned with rocks awash. The reef skirts the western shore at about a third of a mile, and is also steep-to.

**Anchorage.**—In seeking anchorage, it must be borne in mind that the reef surrounding the island is steep-to. There is fair anchorage during the north-east monsoon period off the sandy shore forming the south-west and west sides of the island, in depths of 13 to 16 fathoms, sand and shells; but the best position is just southward of the south-west point, where vessels may conveniently anchor in 10 to 14 fathoms, at half a mile from the shore reef which is steep-to.

It is possible to obtain shelter in a steam vessel from the south-west monsoon by anchoring off the north-east end in 14 or 15 fathoms; but the bottom is rocky, bad holding ground, and by no means to be recommended as an anchorage.

**High rock**, 50 feet high, and the resort of sea birds, lies N.W.  $\frac{1}{2}$  N., nearly 5 miles from Cecir de Mer; half a cable northward of it is a rock a few feet high, with a rock awash beyond it.

In the channel between Cecir de Mer and High rock the depths vary from 9 to 12 fathoms, coral. Near the rock are patches of 6 and 7 fathoms.

The channel between High rock and Holland bank is about 9 miles wide, with depths varying from 7 to 10 fathoms on the patches, and to 15 to 20 fathoms between them; bottom generally sand, or sand and shells at the greater depths, and rocky on the patches.

**HOLLAND BANK** is composed of coral and within the depth of 19 fathoms is  $6\frac{1}{2}$  miles in length by 4 miles in breadth. The shoalest patches are in its eastern half, and cover a space of about  $2\frac{1}{2}$  miles, with an irregular bottom; the least depth found was  $2\frac{1}{2}$  fathoms,\* with the south-west hill of Cecir de Mer S.E. by E.  $\frac{1}{2}$  E., distant  $15\frac{1}{2}$  miles.

The depths around the bank are very irregular, and afford no certain guide, but the bank is much steeper on its eastern edge than elsewhere. The lead, however, is not to be relied on in approaching that edge, for 20 fathoms may be obtained at one cast, and about 4 fathoms at the next. Vessels should pass westward of the buoy.

\*Lat.  $10^{\circ} 32' N.$ .  
Long.  $108^{\circ} 42' E.$

General chart, 2,660a [2,678].

**Buoy.**—An automatic whistle buoy, painted white with the word *Hollandais* on it, is moored in 7 fathoms about 2 miles west of the centre of Holland bank, with the summit (south-west hill) of Pulo Cecir de Mer bearing E. by S.  $\frac{1}{2}$  S., distant 18 miles. The buoy is liable to drift. Vessels passing northward of the bank should not bring the south-west hill of Cecir de Mer, eastward of S.E.  $\frac{1}{2}$  E.; and those passing southward of the bank should not bring the same hill to the southward of E.  $\frac{1}{2}$  S.

The dangers to the westward of Holland bank are described with the mainland in Chapter XII.

**Marne bank,** situated approximately W. by S.  $\frac{1}{2}$  S., distant 22 miles from the summit of Pulo Cecir de Mer, is  $3\frac{1}{2}$  miles in extent east and west, with depths of 9 to 11 fathoms water over it. The bank is said to be steep-to on the western side, but this is not borne out by the chart.

**Juniata bank.**—The U.S.S. *Juniata*, 1888, reported having obtained soundings in 30 fathoms, fine gray sand, in a position about 40 miles eastward of Pulo Cecir de Mer.

**Minerva bank,** with 28 fathoms water, the locality of which is doubtful, is said to lie near the Main track, in the position noted.

Search was made in the *Riflemen* on and near the supposed position of this bank, but no bottom was obtained with 200 fathoms; as a thorough examination was not made, it may, however, exist somewhere near its assigned position. H.M.S. *Sirius*, 1904, sounded near this spot, obtaining no bottom at 95 fathoms, vertical.

#### PARACEL ISLANDS AND REEFS.\*

**General remarks.**—The Paracel islands and reefs are an extensive group of low coral islands and reefs, lying between lat.  $15^{\circ} 46' N.$  and  $17^{\circ} 5' N.$ , long.  $111^{\circ} 13' E.$  and  $112^{\circ} 47' E.$  They consist of two principal groups, the Amphitrite and Crescent, and several reefs and islets.

In fine weather and a clear atmosphere there is no difficulty in navigating between the reefs of the Paracel groups with a look-out aloft, as the trees on the several islands, the heads of rock above water on some of the reefs, and the sea breaking over most of them, give warning of approach to the dangers. In misty or bad weather they should be avoided, and there seems nothing to be gained in passing between them unless seeking anchorage. Sailing vessels should avoid these dangers at all times, for during calms they may be drifted on to the reefs, close to which there is no anchorage.

The anchorages are mostly open, affording shelter, only with the wind off the islands; these are mentioned with the several islands.

**Tides and Currents.**—At the Crescent group, it is high water, full and change, at about 10h. 30m., springs rise 3 feet (see remarks on

\* The description of these islands and reefs is principally from the German Government surveys, executed between the years 1881–1884.

General charts, 2,680a [2,678], 2,681a [2,690].

Chart, 94 [2,719]. tides, page 31). The currents run generally with the wind in both monsoons, but in light winds between the monsoons they are continually changing their direction among the reefs, and sometimes attain the rate of 2 miles an hour.

**Triton island**, the south-westernmost of the Paracels, is a sand cay, 3 feet high and a little more than a mile in length; it stands on a coral reef which extends about  $1\frac{1}{2}$  miles northward and north-eastward, and to about half a mile in other directions. The reef has not more than 6 feet water over it and is steep-to.

This island is the breeding-place of sea birds.

**Passu Keah**, situated about 37 miles E.N.E. from Triton island, Lat. 16° 0' N.  
Long. 111° 14' E. is a sand cay situated on the west end of a coral reef, which is 5 miles in length in an east and west direction and steep-to.

**Discovery reef**, about 9 miles northward of Passu Keah, is 16 miles in length in an east and west direction, by about 5 miles in breadth, and is steep-to, with several rocks a few feet above water; there is barely a depth of 2 fathoms over any part of it. There is a large opening on its south side into the lagoon, and a smaller one on its north side, used by the Chinese fishing boats; the overfalls are very heavy on the reef.

**Vuladdore reef**, lying 6 miles north-eastward of Discovery reef, is 7 miles in extent, east and west,  $2\frac{1}{2}$  miles in breadth, and steep-to. It has a few small spiral rocks on it above water, with high breakers at times.

**Bombay reef** forms the south-east corner of the Paracels group; it is of oblong form, 13 miles in length, east and west, enclosing a lagoon; some of the rocks on its edge are awash and four of them are above high water. The reef is steep-to and breaks.

In December 1904, H.M.S. *Rinaldo* observed two wrecks on the south-east side of Bombay reef, and a third reef near the centre of its northern side. The easternmost of these wrecks\* had her two masts and funnel standing, which formed a good mark; apparently, it may be some time before this vessel breaks up.

**Bremen bank** is situated about 12 miles north of Bombay reef, and is 12 miles in length within a depth of 20 fathoms: the shoalest water found is 7 fathoms at the south-west part of the bank.

**Jehangire bank**, about 6 miles in length, consists of three detached patches lying about 5 miles east-north eastward of the Bremen. The depths on the bank are very irregular; 7 fathoms is the least known depth and it is situated at the south-west extreme of the southern one.

**LINCOLN ISLAND**, the eastern of the Paracel islands, is 1 $\frac{1}{2}$  miles in length, a little more than half a mile wide, and about 15 feet high, the north-east side being cliffy. It is covered with fairly high trees and brushwood, and surrounded by a coral reef, dry at low water, which

extends from one to 3 cables. One of the cocoanut trees is said to form Chart. 94 [2,719].  
a good landmark. Var.  $1\frac{1}{4}$ ° E.

The position of the observation spot (marked by a post) on the west Lat.  $16^{\circ} 40' N.$   
side of Lincoln island, was determined by the officers of the German Long.  $112^{\circ} 43' E.$   
Government survey in 1883.

A narrow coral shoal projecting southward from its south-east point, is said to extend 11 miles, and to be studded with rocks, but judging from the soundings that were obtained by the *Riflemen* the dangerous part of the shoal does not extend more than 3 miles from the island ; time did not admit of its being further examined. Depths of less than 10 fathoms extend about one mile north-west of the island.

On the north and east sides of the island the depths increase rapidly, but towards the south and south-west, depths under 40 fathoms were obtained for nearly 20 miles. The Bremen and Jehangire banks are probably connected with the Lincoln.

**Anchorage.**—Good anchorage can be obtained in the north-east monsoon under the lee of the island in a depth of 10 fathoms, coral, about half a mile from the shore. In the centre of the island, close to a stunted cocoanut tree, there is a well, dug by the Chinese fishermen, into which the water filters.

**Pyramid rock**, a small cone-shaped rock, 17 feet high, lies  $7\frac{1}{4}$  miles S.W.  $\frac{1}{2}$  S. from Lincoln island ; at a distance it might be mistaken for a junk.

**Dido bank**, discovered by H.M.S. *Dido* in 1844, is a small bank with 13 fathoms, sand, and no bottom at the depth of 100 fathoms around ; it lies N.E.  $\frac{1}{2}$  E., distant  $12\frac{1}{2}$  miles from the north end of Lincoln island.

**The CRESCENT GROUP** of islands and reefs, consist of six low sand islands, for the most part connected by reefs, stretching nearly east and west in the form of a crescent ; on the eastern horn of the crescent stand the two Duncan islands, with an opening  $5\frac{1}{2}$  miles wide between the contiguous reef and the Antelope shoal, which lies about 2 miles eastward of Money, the western island of the group. This opening, with a patch of 5 fathoms, charted in the fairway, is on the south side of the chain ; within the crescent are irregular depths of 20 to 40 fathoms with coral heads in places.

**Anchorage.**—The best anchorage is near to the reef, on the north side of Duncan islands, in 10 to 15 fathoms, where there are some broad patches of sandy bottom. The Chinese fishing boats anchor between the two islands, where there are depths of  $1\frac{1}{2}$  to  $2\frac{1}{2}$  fathoms.

**Duncan islands**, of coral, and covered with shrubs, are surrounded by a reef extending about  $1\frac{1}{4}$  miles east and west, with a breadth of two-thirds of a mile, and steep-to. The eastern and larger island, 13 feet high and about half a mile in length, has on its south side a well, near a coco-

Lat.  $16^{\circ} 28' N.$   
Long.  $111^{\circ} 44' E.$

Chart. 94 [2,719]. nut palm. The western island is 10 feet high, and has a cocoanut palm near its centre, forming a good landmark (1884). See anchorage, p. 125.

Lat.  $16^{\circ} 28' N.$   
Long.  $111^{\circ} 46' E.$

**Drummond island**, about half a mile in length, with a breadth of  $2\frac{1}{2}$  cables, is partly covered with brushwood, and separated from the Duncan islands by a channel  $1\frac{1}{2}$  miles wide. In using this channel vessels should pass the Duncan islands at a distance of a quarter to half a mile; there is anchorage close westward of the island reef.

The reef surrounding Drummond island forms the southern portion of the eastern reef of the Crescent group, from whence it trends north-eastward and thence north-westward to Observation bank at its north extreme; there are several sand cays from 3 to 10 feet high, on this reef; the one on Observation bank (and possibly others) is covered with brushwood.

**Pattle island**, on the north-west side of the group, is 5 cables in length,  $2\frac{1}{2}$  cables in breadth and about 30 feet high; on the south side there is a small bay with a sandy beach where a boat may land at low water. The island is covered with brushwood, and at about one-third its length from the western end stands a palm forming a good landmark; near this palm there is a well.

The reef surrounding the island extends  $1\frac{3}{4}$  miles north-eastward of it, and has a rock above water on its edge, about 2 cables northward of Pattle. On either side of this reef there is a clear channel.

**Robert island**, oval in shape, and 26 feet high, is nearly 4 cables in length; it is covered with vegetation and has a well of water. A reef surrounds the island, but there is landing on the eastern side.

Lat.  $16^{\circ} 28' N.$   
Long.  $111^{\circ} 31' E.$

**Money island** is situated on the west side of a reef 3 miles in extent and steep-to; it is 7 cables in length, about 20 feet in height, and covered with brushwood. Several sand cays lie eastward of it on the same reef.

The tidal streams run parallel to the edges of the reef at the rate of  $2\frac{1}{2}$  knots an hour at times.

**Antelope reef**, lying eastward of Money island, is 3 miles in length by 2 miles in breadth, and partly dry at low water.

**The AMPHITRITE GROUP** is the north-easternmost of the Paracels; the two portions of the group, lying north and south of each other, are separated by a deep-water channel, 4 miles wide.

**The Northern group** consists of two reefs separated by Zappe pass. The westernmost of these reefs is 6 miles in length by  $1\frac{1}{4}$  miles in breadth, with a sand cay near its west end, and Tree island 2 miles from its east end. The northern and eastern sides of these reefs are steep-to, but on the south and west sides depths of 5 to 20 fathoms will be found at

a short distance from the reef; at the south-west corner of this group the Chart, 94 [2,719].  
Var. 13° E. 10-fathoms line is a mile from the reef.

**Tree island**, covered with mangrove bushes, and surrounded by a white sand beach, may be recognised by the palm tree (30 feet high) near its centre; it is much frequented by Chinese fishermen, the south-west side of the island affording sheltered anchorage close to it for junks, in 13 feet water. The channel leading to this anchorage is on the south side of the reef, and is two cables wide with a depth of 4 to 6 feet at low water.

The south-eastern reef, on which there are three islands covered with mangrove bushes, is 4 miles in length north-west and south-east, and has three sand cays near its south end; vegetation has commenced on these cays.

Landing can be effected in the openings on the south side of this reef between the islets and cays.

**Zappe pass** is about half a mile wide between the reef on either Lat. 16° 58' N.  
Long. 112° 18' E. side with a least known depth of  $2\frac{1}{2}$  fathoms in mid-channel; it is only available for small craft during smooth water. With a fresh breeze the breakers extend right across; there is usually a strong current through it.

**The Southern group** consists of Woody and Rocky islands lying near each other and on the same surrounding reef.

**Woody island**, the southern and largest island of the group, is Lat. 16° 50' N.  
Long. 112° 20' E. about one mile in length, surrounded by a white sand beach, and covered with trees; landing can be effected on the lee side. The position of its north-east side is given in the margin.

Rocky islet north-east of Woody island, is from 40 to 50 feet high.

The reef surrounding these islands extends to a distance of 3 cables in places, and dries at low water. There are depths of 16 to 30 fathoms at a distance of one mile from the north, west, and south-west sides of Woody island reef, decreasing to 8 or 9 fathoms close-to; and a bank, having 3 to 10 fathoms, extends upwards of 3 miles in a south-easterly direction from this reef, steep-to, on its eastern side.

**Iltis bank**, 3 miles in length and  $1\frac{1}{2}$  miles in breath, with a depth of 8 to 10 fathoms and fairly steep-to, lies 7 miles S.W. by W. from Woody island.

**Anchorages.**—During southerly winds, good anchorage may be obtained in 13 fathoms, sand, about half a mile north of Woody island reef. With north-east winds there is good anchorage in 18 to 20 fathoms, sand, about a quarter of a mile from the south-west side of the reef. The bottom, for 5 miles seaward of this anchorage, is tolerably even, with depths of 27 to 30 fathoms. There is also good anchorage on the lee side of the Northern Amphitrite group, the best being that to the southward of North island, in 11 to 16 fathoms, coral and sand.

Charts. 94 [2,719],  
270 [2,720].  
Lat. 17° 24' N.  
Long. 111° 29' E.  
Var. 14° E.

**NORTH REEF**, the north-western danger of the Paracels, is about 6 miles in length, east and west, 3 miles in breadth, and steep-to in most places. The edge of the reef all round has rocks just above water and the noise of the breakers over the reef may be heard from some distance at times. There are portions of two or more wrecks on this reef; on the south-west side is a boat passage into the lagoon. Its west extreme is charted in the position given.

**Hotspur shoal**, on which an American ship of this name was said to have been wrecked in 1860, is charted in lat. 16° 50' N., long. 111° 30' E.; it was probably the North reef that this vessel struck upon.

**MACCLESFIELD BANK**, discovered by the English ship of that name in 1701, lies between lat. 15° 24' N. and 16° 15' N., and long. 113° 40' E. to 114° 57' E.

Reports of shallow water on the edge of this bank caused its partial survey by H.M.S. *Penguin* in 1892 and *Egeria* in 1892-3. A previous partial survey showed that this coral bank rose rapidly out of deep water, was about 75 miles in length in a N.E. by E. and opposite direction, with an extreme breadth of 33 miles, and that it was a submerged atoll, with a general depth of about 40 fathoms over a large part of its area, and with distinct indications of a shallow rim surrounding this area. The general result of the whole examination may be stated to be that on the whole of the 200 miles forming the periphery of the bank there exists a coral rim about 3 miles wide of luxurious growth and at a remarkably even depth below the surface of from 7 to 14 fathoms; this rim being broken here and there by passages of greater depth, but less than the general depths of from 40 to 50 fathoms which prevail over the central portion of the bank.

Lat. 16° 14' N.  
Long. 114° 48' E.

On one spot only of the rim (near its north-east end on Pigmy shoal) was a depth of as little as 6½ fathoms found, and on a patch in the centre of the lagoon a small spot of 5 fathoms (Walker shoal) was the shoalest water found. The western portion has only been partially surveyed.

The depth of the surrounding ocean is about 1,300 fathoms, the bottom globigerina ooze; the south face of the bank is almost perpendicular to 600 fathoms, the west is very steep, but the north face slopes gradually from 60 fathoms, close to the rim, to 200 fathoms at 10 miles northward.

**Caution.**—The bank may generally be seen from aloft on approaching by the greenish colour of the water. In heavy weather the sea on its edge is high and confused. As it is quite possible that shallow coral heads may exist in the unsurveyed portion and that others may have escaped the lead in the part which has been more fully examined, it is recommended that vessels should pass either eastward or westward of Macclesfield bank and not over it.

**SCARBOROUGH REEF**, triangular in shape and about 10 miles in length, is situated with its north extreme in the position given in the margin.

Lat.  $15^{\circ} 12' N.$   
Long.  $117^{\circ} 44' E.$   
Var.  $1^{\circ} E.$

The reef which is steep-to all round, consists of a narrow belt of coral, nearly level with the water's edge, enclosing a lagoon of clear blue water. On the belt are scattered several rocks 3 to 10 feet high and visible about 5 miles. The highest rock, 10 feet, is situated at the south-east extreme of the reef. Close northward of it is the opening of the lagoon about 2 cables wide, which is encumbered with patches of reef with about  $1\frac{1}{2}$  fathoms over them and 5 to 6 fathoms between; just within the entrance it is shallow. It is just possible to find a precarious anchorage off the entrance to the lagoon in calm weather.

The current in the vicinity of the reef varies with the monsoon.

**Tides.**—It is high water, full and change, on Scarborough reef about 11h.; springs rise 5 feet.

**TRURO SHOAL**, was discovered by Capt. T. J. Duggan, of the ship *Truro*, in September, 1857. He states, "Whilst taking my forenoon observations, distinctly saw the bottom, white coral. Got a cast of the lead instantly in 10 fathoms; again, about half a mile farther north, had 19 fathoms; steered north for another half mile, and had 22 fathoms, and the next cast no bottom at 40 fathoms; no shoal patches were visible from the mast-head." Another patch of 10 fathoms is charted 4 miles north-east of that described.

Lat.  $16^{\circ} 19' N.$   
Long.  $116^{\circ} 44' E.$

**ST. ESPRIT SHOAL**, of coal formation, is about 2 miles in length, east and west, and one mile in breadth; its centre being in the position given. The general depths on this shoal are 9 fathoms, the least water obtained being 7 fathoms, with from 60 to 80 fathoms at a short distance.

**Helen shoal**, about 52 miles south-eastward of St. Esprit shoal, is 2 miles in length, east and west, and one mile in breadth. The least water found is  $6\frac{1}{2}$  fathoms, the general depths being 8 and 9 fathoms, with no bottom at 100 fathoms close around.

**Current.**—Strong tide-rips were observed in the vicinity of St. Esprit and Helen shoals, but on examination deep water was found to exist. The current was found to set generally with the wind.

**PRATAS ISLAND, and REEF.**—**Pratas island**, the north-east end of which is in the position given, is situated on the west side, on the middle of the sunken part of Pratas reef. It is about  $1\frac{1}{2}$  miles in length, east and west, half a mile in breath, and 40 feet in height, of which elevation the scrubby bushes, with which it is covered, form about 10 feet; it is visible from the distance of about 12 miles in clear weather.

Lat.  $20^{\circ} 42' N.$   
Long.  $116^{\circ} 43' E.$

Charts, 84 [2,719],  
270 [2,720].  
Lat.  $17^{\circ} 24' N.$   
Long.  $111^{\circ} 29' E.$   
Var.  $1^{\circ} E.$

**NORTH REEF**, the north-western danger of the Paracels, is about 6 miles in length, east and west, 3 miles in breadth, and steep-to in most places. The edge of the reef all round has rocks just above water and the noise of the breakers over the reef may be heard from some distance at times. There are portions of two or more wrecks on this reef; on the south-west side is a boat passage into the lagoon. Its west extreme is charted in the position given.

**Hotspur shoal**, on which an American ship of this name was said to have been wrecked in 1860, is charted in lat.  $16^{\circ} 50' N.$ , long.  $111^{\circ} 30' E.$ ; it was probably the North reef that this vessel struck upon.

**MACCLESFIELD BANK**, discovered by the English ship of that name in 1701, lies between lat.  $15^{\circ} 24' N.$  and  $16^{\circ} 15' N.$ , and long.  $113^{\circ} 40' E.$  to  $114^{\circ} 57' E.$

Reports of shallow water on the edge of this bank caused its partial survey by H.M.S. *Penguin* in 1892 and *Egeria* in 1892-3. A previous partial survey showed that this coral bank rose rapidly out of deep water, was about 75 miles in length in a N.E. by E. and opposite direction, with an extreme breadth of 33 miles, and that it was a submerged atoll, with a general depth of about 40 fathoms over a large part of its area, and with distinct indications of a shallow rim surrounding this area. The general result of the whole examination may be stated to be that on the whole of the 200 miles forming the periphery of the bank there exists a coral rim about 3 miles wide of luxurious growth and at a remarkably even depth below the surface of from 7 to 14 fathoms; this rim being broken here and there by passages of greater depth, but less than the general depths of from 40 to 50 fathoms which prevail over the central portion of the bank.

Lat.  $16^{\circ} 14' N.$   
Long.  $114^{\circ} 48' E.$

On one spot only of the rim (near its north-east end on Pigmy shoal) was a depth of as little as  $6\frac{1}{2}$  fathoms found, and on a patch in the centre of the lagoon a small spot of 5 fathoms (Walker shoal) was the shoalest water found. The western portion has only been partially surveyed.

The depth of the surrounding ocean is about 1,300 fathoms, the bottom globigerina ooze; the south face of the bank is almost perpendicular to 600 fathoms, the west is very steep, but the north face slopes gradually from 60 fathoms, close to the rim, to 200 fathoms at 10 miles northward.

**Caution.**—The bank may generally be seen from aloft on approaching by the greenish colour of the water. In heavy weather the sea on its edge is high and confused. As it is quite possible that shallow coral heads may exist in the unsurveyed portion and that others may have escaped the lead in the part which has been more fully examined, it is recommended that vessels should pass either eastward or westward of Macclesfield bank and not over it.

**SCARBOROUGH REEF**, triangular in shape and about 10 miles in length, is situated with its north extreme in the position given in the margin. Chart, 362 [2,721].  
Lat. 15° 12' N.  
Long. 117° 44' E.  
Var. 1° E.

The reef which is steep-to all round, consists of a narrow belt of coral, nearly level with the water's edge, enclosing a lagoon of clear blue water. On the belt are scattered several rocks 3 to 10 feet high and visible about 5 miles. The highest rock, 10 feet, is situated at the south-east extreme of the reef. Close northward of it is the opening of the lagoon about 2 cables wide, which is encumbered with patches of reef with about  $1\frac{1}{2}$  fathoms over them and 5 to 6 fathoms between; just within the entrance it is shallow. It is just possible to find a precarious anchorage off the entrance to the lagoon in calm weather.

The current in the vicinity of the reef varies with the monsoon.

**Tides.**—It is high water, full and change, on Scarborough reef about 11h.; springs rise 5 feet.

**TRURO SHOAL**, was discovered by Capt. T. J. Duggan, of the ship *Truro*, in September, 1857. He states, "Whilst taking my forenoon observations, distinctly saw the bottom, white coral. Got a cast of the lead instantly in 10 fathoms; again, about half a mile farther north, had 19 fathoms; steered north for another half mile, and had 22 fathoms, and the next cast no bottom at 40 fathoms; no shoal patches were visible from the mast-head." Another patch of 10 fathoms is charted 4 miles north-east of that described. Lat. 16° 19' N.  
Long. 116° 44' E.

**ST. ESPRIT SHOAL**, of coal formation, is about 2 miles in length, east and west, and one mile in breadth; its centre being in the position given. The general depths on this shoal are 9 fathoms, the least water obtained being 7 fathoms, with from 60 to 80 fathoms at a short distance. Lat. 19° 33' N.  
Long. 113° 2' E.

**Helen shoal**, about 52 miles south-eastward of St. Esprit shoal, is 2 miles in length, east and west, and one mile in breadth. The least water found is  $6\frac{1}{2}$  fathoms, the general depths being 8 and 9 fathoms, with no bottom at 100 fathoms close around. Lat. 19° 12' N.  
Long. 113° 53' E.

**Current.**—Strong tide-rips were observed in the vicinity of St. Esprit and Helen shoals, but on examination deep water was found to exist. The current was found to set generally with the wind.

**PRATAS ISLAND, and REEF.**—Pratas island, the north-east end of which is in the position given, is situated on the west side, on the middle of the sunken part of Pratas reef. It is about  $1\frac{1}{2}$  miles in length, east and west, half a mile in breath, and 40 feet in height, of which elevation the scrubby bushes, with which it is covered, form about 10 feet; it is visible from the distance of about 12 miles in clear weather. Lat. 20° 42' N.  
Long. 116° 43' E.

Chart 362 [2,721]. In the hazy weather, which generally prevails during the north-east monsoon, the island is seldom visible beyond 5 or 6 miles, and the breakers at the edge of the reef may possibly not be seen until within one mile of them.

The island is composed of sand, and its shape is that of a horse-shoe, enclosing a shallow inlet on its western side, half a mile in length, affording shelter to the Chinese fishermen who come here in the early part of the year. Brackish water can be obtained by digging a few feet into the sand. Sea birds are numerous in the breeding season.

\*Lat.  $20^{\circ} 46' N.$   
Long.  $116^{\circ} 53' E.$

**Pratas reef**, the north-east point of which\* is over 10 miles from the island, is a coral barrier of circular form, enclosing a lagoon with 5 to 10 fathoms water, thickly studded with coral knolls round its margin, but comparatively clear near the middle. The reef is about 40 miles in circumference, and one to 2 miles in breadth. The north, east, and south sides are just dry at low-water springs and steep-to; the western side forms a sunken barrier, across which are two channels leading into the lagoon, one on each side of Pratas island.

The north channel is about 3 miles wide, between the island and the edge of the breakers, and a depth of about 3 fathoms may be carried near the middle of it at low-water springs. The south channel is by far the better of the two, being wider and a little deeper; it has also, apparently, comparative freedom from coral knolls. This channel is believed to be available for vessels of 15 feet draught; great caution, however, is required, and the vessel should be conned from aloft, having if possible, the sun astern or abeam.

**Tides.**—During the survey of Pratas reef, April, 1858, it was high water, full and change, at about 4h.; with a spring rise of about 5 feet. There was only one perceptible ebb and flow in the 24 hours at the springs. The highest tide occurred on the third day after full moon, but the tides were very irregular.

**Anchorage.**—Although Pratas reef is steep-to in most parts, there are several spots where, in case of necessity, a vessel might find anchorage outside the breakers; particularly on the west side, abreast the middle of the channels through the sunken part of the reef, and at the distance of about 2 miles on either side of the island. At each of these spots there is good anchorage in the north-east monsoon, in 20 to 10 fathoms, but the position abreast the south channel is considered the better of the two, the sunken reef at this part being deeper and the bottom more even than in the channel north of the island. There is anchorage in about 20 fathoms coral and clay, at about one mile westward of the west end of the island. A vessel of light draught might even anchor in safety on the reef, in the middle of the south channel in  $3\frac{1}{2}$  fathoms at low water, or cross it and take up a berth inside the lagoon in 10 fathoms, fine sand.

Many coral knolls doubtless exist besides those marked on the plan. Chart, 362 [2,721]  
(See remarks, on the plan.) Var. 1° E.

**Directions.**—During the strength of the monsoons sailing vessels should always endeavour to pass to leeward of Pratas reef; on account of the invariable set of the current to leeward; for there are no soundings to indicate a near approach, and the weather is frequently thick and hazy in this vicinity. The safest quarter to make the reef is from the westward, the island being on its western side, and the currents in the neighbourhood invariably running in a north-east or opposite direction, according to the monsoon. Approaching the reef a vessel should be conned from aloft, as with the sun in a favourable position the bottom can be seen in 10 fathoms.

The Pratas reef, lying in the route between Manila and Hong Kong, is a serious danger, especially in the north-east monsoon when strong gales and thick clouds are sometimes prevalent for weeks together; and as, in this monsoon, ships generally approach the reef from the south-eastward, the greater number of wrecks have occurred on this side.

**Current.**—About 50 miles south-east of the Pratas reef, a current was experienced by H.M.S. *Encounter* setting W. by N.  $\frac{3}{4}$  N. 51 miles in 24 hours.

**Tide rips,** having the appearance of a heavy line of breakers, were observed from the s.s. *Wheeling* about 40 miles north-east of the Pratas in the position noted. Lat.  $21^{\circ} 10' N.$ . Long.  $117^{\circ} 29' E.$

**VEREKER BANKS,** two in number, are situated about 40 miles north-westward of Pratas reef; both are steep-to with deep water between and around them.

North Vereker bank is 11 miles in length, in a north-west and south-east direction, and 7 miles in breadth within a depth of 100 fathoms; the least depth obtained was 35 fathoms,\* two miles south-east of the centre of the bank. No live coral was found.

South Vereker bank, 8 miles in length, has a least depth of 32 fathoms, † two miles westward of the centre of the bank. The depths between the banks are from 150 to 180 fathoms.

Heavy overfalls and tide-rips were met with in the vicinity of these banks.

**Current.**—During the examination of Vereker banks (February) the current ran between W.N.W. and S.S.W., from a half to one knot per hour; the prevailing set was between W.N.W. and W.S.W. The current at times set to windward. During calms or light south-west winds, the current set between S.S.E. and E.S.E., with a rate of from a quarter to one knot per hour.

## CHAPTER V.

## NORTH-WEST COAST OF BORNEO.

## TANJONG DATU TO BRUNI RIVER.

Chart, 1,746  
[2,584].  
Var. 2<sup>o</sup>. E.

**General remarks.**—The north-west coast of Borneo eastward of Tanjong Datu includes the independent native state of Sarawak, and part of the territory of the British North Borneo Company, for an account of which see pages 9–11.

Much of the country bordering this coast is low, but about 25 miles inland there is a mountain range which stretches in a north-easterly direction through Bruni and North Borneo, terminating 50 miles from the northern extreme of the island, in the great mountain of Kini Balu. In addition to this range, and running parallel to it, is a coast range.

Lat. 2° 54' N.  
Long. 109° 39' E.

Tanjong Datu and the shoals off it have been described on page 55.

**The COAST.**—Between Tanjong Datu and Tanjong Sipang, the extremity of a similar high peninsula, 44 miles to the eastward, the coast forms a deep bay, near the head of which the Lundu river and some minor streams discharge; at the east end of the bay is the Santubong entrance of the Sarawak river. There are no dangers in this bay outside the depth of 5 fathoms, but it has not been properly examined, and every caution should be observed in this locality.

**Pigmy shoal.**—H.M.S. *Pigmy* (1894) when in a position about 9½ miles S. 88° E. from Tanjong Datu obtained a depth of 7 fathoms where 13 fathoms was charted; for a distance of 20 miles E.S.E. from that position less water than that shown on the charts was also found.

The coast from Tanjong Datu trends southward for about 6 miles to Pirate point, within which is Pirate or Sleepy bay; thence it runs south-eastward to Lundu river. The charts show it fronted by rocks and foul ground to the distance of about 2 miles, as far southward as the Talan isles, but the dangers here have not been accurately determined; several rocks are visible at low water southward of Sleepy bay.

Sleepy or Pirate bay affords shelter during the south-west monsoon for boats or small craft in 2 to 3 fathoms, observing that the approach is encumbered with rocks that are uncharted.

**The Talan islands** lie 13 miles south-eastward from Tanjong Datu, and deserve notice as affording shelter under their lee for boats.

General chart, 2,660a [2,678].

A sand bank extends a short distance southward of Talan, the northern island. On the east side of the island is a sandy beach where turtle resort in the season. The island is inhabited, and a small quantity of indifferent water is obtainable.

**Turtle rock** lies S.S.W. about three-quarters of a mile from Little Talan island, with the east side of Talan touching the north end of Little Talan; it uncovers at low water.

Siru river, abreast the Talan islands, may be entered in a small boat in very fine weather.

Samatan river, situated 5 miles eastward of the Siru, is apparently deeper than that stream. Within the entrance is a fishing station with a few huts.

**A rock** awash is charted about a mile off Observatory point, about midway between Samatan and Lundu rivers; others may exist.

**Lundu river** has an estuary about 4 miles wide, blocked by a sand bank extending from its east point nearly to Baugh point. On this bank is Lundu rock, dry at low water springs.

Until further examination, no vessel should come with a depth of 5 fathoms hereabouts, as there is reason to believe that the ground is foul between Lundu rock and Sampadien island.

The Lundu is available for boats. The best channel will be found by passing close to the rocks at Baugh point, and following the curvature of the banks at a short distance from the trees. This course carried the *Samarang's* boats safely in and out at low water, which is the best time to enter, when the channel is marked by the sands left dry.

After passing the flats in the estuary and reaching the first sandy point on the west, depths of 4 and 6 fathoms will be found by following the bends. The town of Tundong is situated 9 miles from the mouth, and contains about 1,000 inhabitants; it was formerly defended by a boom.

The water at the village is fresh, and was found to be good within 5 miles of the mouth.

**Islands.**—Sampadien island, about three-quarters of a mile in length, stands on the eastern part of a reef 2 miles off shore, and  $1\frac{1}{2}$  miles in extent, on which are many rocks above water.

Satang\* and Little Satang about a mile apart in a north and south direction have fringing reefs; they lie from 3 to 5 miles off the shore of the bay westward of Tanjong Sipang, within the 5-fathoms line of soundings; they form the west side of approach to the Santubong entrance of Sarawak river.

**Directions.—Tides.—Caution.**—Sailing vessels navigating this coast must always be prepared to drop a light anchor should a calm attend an opposing tidal stream, particularly between Tanjong Api and

General chart, 2,600a [2,678].

## CHAPTER V.

## NORTH-WEST COAST OF BORNEO.

## TANJONG DATU TO BRUNI RIVER.

Chart. 1,746  
[2,581].  
Var. 2<sup>o</sup>E.

**General remarks.**—The north-west coast of Borneo eastward of Tanjong Datu includes the independent native state of Sarawak, and part of the territory of the British North Borneo Company, for an account of which see pages 9–11.

Much of the country bordering this coast is low, but about 25 miles inland there is a mountain range which stretches in a north-easterly direction through Bruni and North Borneo, terminating 50 miles from the northern extreme of the island, in the great mountain of Kini Balu. In addition to this range, and running parallel to it, is a coast range.

Lat. 2° 53' N.  
Long. 109° 39' E.

Tanjong Datu and the shoals off it have been described on page 55.

**The COAST.**—Between Tanjong Datu and Tanjong Sipang, the extremity of a similar high peninsula, 44 miles to the eastward, the coast forms a deep bay, near the head of which the Lundu river and some minor streams discharge; at the east end of the bay is the Santubong entrance of the Sarawak river. There are no dangers in this bay outside the depth of 5 fathoms, but it has not been properly examined, and every caution should be observed in this locality.

**Pigmy shoal.**—H.M.S. *Pigmy* (1894) when in a position about 9½ miles S. 88° E. from Tanjong Datu obtained a depth of 7 fathoms where 13 fathoms was charted; for a distance of 20 miles E.S.E. from that position less water than that shown on the charts was also found.

**The coast** from Tanjong Datu trends southward for about 6 miles to Pirate point, within which is Pirate or Sleepy bay; thence it runs south-eastward to Lundu river. The charts show it fronted by rocks and foul ground to the distance of about 2 miles, as far southward as the Talan isles, but the dangers here have not been accurately determined; several rocks are visible at low water southward of Sleepy bay.

**Sleepy** or **Pirate** bay affords shelter during the south-west monsoon for boats or small craft in 2 to 3 fathoms, observing that the approach is encumbered with rocks that are uncharted.

Lat. 1° 55' N.  
Long. 109° 47' E.

**The Talan islands** lie 13 miles south-eastward from Tanjong Datu, and deserve notice as affording shelter under their lee for boats.

General chart, 2,600a [2,678].

A sand bank extends a short distance southward of Talan, the northern island. On the east side of the island is a sandy beach where turtle resort in the season. The island is inhabited, and a small quantity of indifferent water is obtainable.

**Turtle rock** lies S.S.W. about three-quarters of a mile from Little Talan island, with the east side of Talan touching the north end of Little Talan; it uncovers at low water.

Siru river, abreast the Talan islands, may be entered in a small boat in very fine weather.

Samatan river, situated 5 miles eastward of the Siru, is apparently deeper than that stream. Within the entrance is a fishing station with a few huts.

**A rock** awash is charted about a mile off Observatory point, about midway between Samatan and Lundu rivers; others may exist.

**Lundu river** has an estuary about 4 miles wide, blocked by a sand bank extending from its east point nearly to Baugh point. On this bank is Lundu rock, dry at low water springs.

Until further examination, no vessel should come with a depth of 5 fathoms hereabouts, as there is reason to believe that the ground is foul between Lundu rock and Sampadien island.

The Lundu is available for boats. The best channel will be found by passing close to the rocks at Baugh point, and following the curvature of the banks at a short distance from the trees. This course carried the *Samarang's* boats safely in and out at low water, which is the best time to enter, when the channel is marked by the sands left dry.

After passing the flats in the estuary and reaching the first sandy point on the west, depths of 4 and 6 fathoms will be found by following the bends. The town of Tundong is situated 9 miles from the mouth, and contains about 1,000 inhabitants; it was formerly defended by a boom.

The water at the village is fresh, and was found to be good within 5 miles of the mouth.

**Islands.**—Sampadien island, about three-quarters of a mile in length, stands on the eastern part of a reef 2 miles off shore, and  $1\frac{1}{2}$  miles in extent, on which are many rocks above water.

Satang\* and Little Satang about a mile apart in a north and south direction have fringing reefs; they lie from 3 to 5 miles off the shore of the bay westward of Tanjong Sipang, within the 5-fathoms line of soundings; they form the west side of approach to the Santubong entrance of Sarawak river.

**Directions.—Tides.—Caution.**—Sailing vessels navigating this coast must always be prepared to drop a light anchor should a calm attend an opposing tidal stream, particularly between Tanjong Api and

General chart, 3,660a [2,678].

Chart, 1,746  
[2,584]  
Var. 2° E.

Lat. 1° 44' N.  
Long. 109° 56' E.

## CHAPTER V.

## NORTH-WEST COAST OF BORNEO.

## TANJONG DATU TO BRUNI RIVER.

Chart. 1,746  
[2,684].  
Var. 2° E.

**General remarks.**—The north-west coast of Borneo eastward of Tanjong Datu includes the independent native state of Sarawak, and part of the territory of the British North Borneo Company, for an account of which see pages 9–11.

Much of the country bordering this coast is low, but about 25 miles inland there is a mountain range which stretches in a north-easterly direction through Bruni and North Borneo, terminating 50 miles from the northern extreme of the island, in the great mountain of Kini Balu. In addition to this range, and running parallel to it, is a coast range.

Lat. 2° 53' N.  
Long. 109° 39' E.

Tanjong Datu and the shoals off it have been described on page 55.

**The COAST.**—Between Tanjong Datu and Tanjong Sipang, the extremity of a similar high peninsula, 44 miles to the eastward, the coast forms a deep bay, near the head of which the Lundu river and some minor streams discharge; at the east end of the bay is the Santubong entrance of the Sarawak river. There are no dangers in this bay outside the depth of 5 fathoms, but it has not been properly examined, and every caution should be observed in this locality.

**Pigmy shoal.**—H.M.S. *Pigmy* (1894) when in a position about 9½ miles S. 88° E. from Tanjong Datu obtained a depth of 7 fathoms where 13 fathoms was charted; for a distance of 20 miles E.S.E. from that position less water than that shown on the charts was also found.

**The coast** from Tanjong Datu trends southward for about 6 miles to Pirate point, within which is Pirate or Sleepy bay; thence it runs south-eastward to Lundu river. The charts show it fronted by rocks and foul ground to the distance of about 2 miles, as far southward as the Talan isles, but the dangers here have not been accurately determined; several rocks are visible at low water southward of Sleepy bay.

**Sleepy** or **Pirate** bay affords shelter during the south-west monsoon for boats or small craft in 2 to 3 fathoms, observing that the approach is encumbered with rocks that are uncharted.

Lat. 1° 55' N.  
Long. 109° 47' E.

**The Talan islands** lie 13 miles south-eastward from Tanjong Datu, and deserve notice as affording shelter under their lee for boats.

General chart, 2,680a [2,678].

A sand bank extends a short distance southward of Talan, the northern island. On the east side of the island is a sandy beach where turtle resort in the season. The island is inhabited, and a small quantity of indifferent water is obtainable.

**Turtle rock** lies S.S.W. about three-quarters of a mile from Little Talan island, with the east side of Talan touching the north end of Little Talan; it uncovers at low water.

Siru river, abreast the Talan islands, may be entered in a small boat in very fine weather.

Samatan river, situated 5 miles eastward of the Siru, is apparently deeper than that stream. Within the entrance is a fishing station with a few huts.

**A rock** awash is charted about a mile off Observatory point, about midway between Samatan and Lundu rivers; others may exist.

**Lundu river** has an estuary about 4 miles wide, blocked by a sand bank extending from its east point nearly to Baugh point. On this bank is Lundu rock, dry at low water springs.

Until further examination, no vessel should come with a depth of 5 fathoms hereabouts, as there is reason to believe that the ground is foul between Lundu rock and Sampadien island.

The Lundu is available for boats. The best channel will be found by passing close to the rocks at Baugh point, and following the curvature of the banks at a short distance from the trees. This course carried the *Samarang's* boats safely in and out at low water, which is the best time to enter, when the channel is marked by the sands left dry.

After passing the flats in the estuary and reaching the first sandy point on the west, depths of 4 and 6 fathoms will be found by following the bends. The town of Tundong is situated 9 miles from the mouth, and contains about 1,000 inhabitants; it was formerly defended by a boom.

The water at the village is fresh, and was found to be good within 5 miles of the mouth.

**Islands.**—Sampadien island, about three-quarters of a mile in length, stands on the eastern part of a reef 2 miles off shore, and 1½ miles in extent, on which are many rocks above water.

Satang\* and Little Satang about a mile apart in a north and south direction have fringing reefs; they lie from 3 to 5 miles off the shore of the bay westward of Tanjong Sipang, within the 5-fathoms line of soundings; they form the west side of approach to the Santubong entrance of Sarawak river.

\*Lat. 1° 47' N.  
Long. 110° 9' E.

**Directions.—Tides.—Caution.**—Sailing vessels navigating this coast must always be prepared to drop a light anchor should a calm attend an opposing tidal stream, particularly between Tanjong Api and

Charts. 1,746  
[2,584], 1,822  
[2,585].  
Var. 2° E.

Tanjong Sirik. In the depth of 14 fathoms no danger may be apprehended. The flood does not run more than four hours, but the strength of the ebb prevails for eight hours; therefore, where calms are frequent, and steam not available, no advance can be made without great attention to this subject. Off Tanjung Datu, in June, the ebb has been known to run for 15 hours, at an average velocity of  $1\frac{1}{2}$  knots per hour.

**Proceeding eastward**, if not intending to enter Sarawak river, Tanjung Sipang should be kept bearing southward of W. by S., until well eastward of the entrance, to avoid the shallow water lying between Polighouse and Burong island; when within 4 miles of the lighthouse, this bearing, even, would lead into from  $3\frac{1}{2}$  to 4 fathoms. There is considerable indraught on the flood to the several rivers between the Sarawak river and cape Sirik.

Lat.  $1^{\circ} 48'$  N.  
Long.  $110^{\circ} 20'$  E.

**SARAWAK RIVER APPROACH.**--Tanjong Sipang, the northern extreme of a mountainous peninsula about 5 miles in length, lies between the two main entrances to Sarawak river. It may always be distinguished from the eastward or westward by two remarkable thumbs or sugar-loaf cones which show out clear from these directions. The southern crest of the range, mount Santubong, 2,712 feet in height, may be seen in clear weather from a distance of 40 miles.

Matang peak, about 11 miles south-westward of mount Santubong, is 3,168 feet in height, very sharp, and a prominent object. Westward of it and a little lower is a lump resembling a castle, and formerly known as Topsail peak; it is not visible eastward of Santubong peak. These mountains serve to identify the approach to Sarawak river.

On the western side of Sipang, a little southward of the extreme, there is a trickle of good water.

Lat.  $1^{\circ} 51'$  N.  
Long.  $110^{\circ} 20'$  E.

**Cruizer rock**, situated  $3\frac{1}{2}$  miles north of the east extreme of Tanjong Sipang, uncovers at half ebb, with 5 to 6 fathoms close-to, and is difficult to distinguish. At a quarter of a mile S.W. by W.  $\frac{1}{2}$  W. from Cruizer rock there is a patch of 3 fathoms, with the above depths close-around. Matang peak, in line with the western side of Tanjong Sipang, bearing S.S.W.  $\frac{1}{2}$  W., leads eastward of Cruizer rock; the eastern points of Tanjong Sipang peninsula in line leads westward of the rock and of the 3-fathoms patch.

**The SARAWAK RIVER**, on which is situated the town of Kuching or Sarawak, has two navigable entrances, the Moratabas, eastward of Tanjong Sipang, and the Santubong to the westward of it; the distance to Kuching or Sarawak is about 20 miles by either branch from their entrances. The Moratabas entrance is the one generally used, and has a depth of 18 feet at low water springs; the Santubong, though it has

a low water depth of about 13 feet, is not navigable in the north-east monsoon, as at that period there is a heavy swell on its bar.

Charts, 1,746  
[2,584], 1,822  
[2,585].  
Var. 2° E.

Vessels of about 15 feet draught can go up to the town; those above that draught should not go beyond Kwop anchorage. The river is scarcely available to vessels above 18 feet draught until it has been properly surveyed.\*

**LIGHT.**—On the south-east part of Po point stands a white light-house, from which a *fixed white* light is exhibited at an elevation of 490 feet above the sea; the range of visibility is doubtful, apparently about 6 or 7 miles.

The light is obscured in the direction of Cruizer rock by the hill north-west of it.

**Pilots.**—There are no regular pilots for Saráwak river. There is, however, no great difficulty in a vessel of 15 feet draught reaching Kwop anchorage, from whence a message may be sent to the Rajah asking for local assistance should a vessel wish to proceed up to the town. The men here have but little knowledge of handling vessels, and should be carefully watched. The masters of steamers, trading with Singapore, &c., will usually undertake the duty; and it is advisable, if proceeding from Singapore, to endeavour to arrange with one there for the purpose.

**Tides.**—It is high water, full and change, at the Moratabas entrance at 4h., springs rise 9 feet, neaps 5½ feet; at the Santubong entrance, at 4h., springs rise 10 feet, neaps 6 feet; at the Saráwak junction at 5h., and at Kuching at 5h. 20m., springs rise 15 to 18 feet, neaps 9 feet.

The highest tides occur at night when the sun is south of the equator, and during the day when the sun is north of the equator, see tides, page 32.

Off Kuching the ebb stream is stated to run from 4 to 5 knots at springs, and from one to 3 knots at neaps; in the entrances it is probably considerably less than half of these velocities.

Between the junction of the Kwop and Kuching the rise of tide is at times as much as 22 feet, the ebb lasting 7 hours and flood 5 hours. During freshets, the water from the interior sometimes causes a current to run out of the river for several days continuously. At this time the flood is not felt, the water coming up underneath. It is stated on the chart that the ebb combined with the current obtains a velocity at times of 9 knots off Kuching.

**MORATABAS ENTRANCE.—Depths.**—The Moratabas is the main entrance to Saráwak river, and leads to Kuching, the capital, about 20 miles above Moratabas point. Vessels above 15 feet draught

Lat. 1° 45' N.  
Long. 110° 32' E.

\* H.M.S. *Porpoise*, 15½ feet draught, entered the Saráwak river by the Moratabas entrance, and went up to Kwop anchorage without a pilot in August, 1896.

General chart, 2,660c [2,676].

Charts, 1,746  
[2,584], 1,822  
2,585].  
Var. 2° E.

and 200 feet in length cannot, without considerable risk, go above Kwop anchorage, the junction with Kwop river, about 11 miles above Moratabas point. From this anchorage there is a straight road to Kuching only 3 miles distant.

Lat. 1° 39' N.  
Long. 110° 31' E.

From latest reports there is a depth of 18 feet at low-water springs over the bar of the Moratabas, situated about  $1\frac{1}{2}$  miles eastward of the point of the same name; this would give a depth of 27 feet at high-water springs,  $23\frac{1}{2}$  feet at high-water neaps, and  $21\frac{1}{2}$  feet at low-water neaps.

**Caution.**—The depths are noted on the chart to be less in places than those given, and the banks are somewhat liable to change; the chart, therefore, which is old, should be used with considerable caution. The services of a pilot are advisable.

During strong northerly winds there is considerable scend in the entrance, and it is not advisable for vessels above 18 feet draught to attempt to enter.

**Dangers in the approach.**—The coast northward of the lighthouse, to the north extreme of the island on which it stands, is backed by the Moratabas range of hills, and there are no known dangers beyond the 5-fathoms line. White islet, 6 feet high, lies about half a mile north-eastward of the lighthouse.

The bay between Po point lighthouse and Moratabas point is fronted by a sand and mud flat, dry at low water to the distance of a mile, with depths gradually increasing to 3 fathoms at  $2\frac{1}{2}$  miles off shore; from the apex of the bank the lighthouse bears N.N.W.  $\frac{1}{2}$  W., distant  $2\frac{1}{6}$  miles.

\*Lat. 1° 41' N.  
Long. 110° 32' E.

**Patches.**—In the fairway a patch of  $2\frac{1}{4}$  fathoms is charted with the lighthouse N.W.  $\frac{1}{2}$  W. distant one mile; and a patch with same depth, marked *Scout*,\* with the lighthouse N.W.  $\frac{1}{2}$  N. distant 2 miles. A ridge with 3 fathoms, nearly a mile in length, runs parallel to the fairway southward of the Scout, and there is also a patch of 3 fathoms northward of the Scout, but these depths are as much as will be found on the bar; they are all probably of sand. H.M.S. *Alacrity*, 1899, obtained a sounding of 14 feet in a position with Po point bearing N.  $23^{\circ}$  W., distant  $2\frac{2}{10}$  miles, and Moratabas point S.  $47^{\circ}$  W.

The 3-fathoms and 5-fathoms lines of soundings eastward of the fairway lie from  $1\frac{1}{2}$  to nearly 2 miles eastward of the lighthouse; their continuation northward and eastward lies considerably northward of a line joining the lighthouse to Burong island.

**The bar**, with about 3 fathoms, at low water, hard sand, lies E.N.E. from  $1\frac{1}{2}$  to  $1\frac{3}{4}$  miles from Moratabas point.

Small sand banks form on the bar, but are washed away again after a short time.

**Buoy.**—A red buoy, not to be depended on, is charted on the edge of the shore bank with Po point lighthouse, bearing N. 14° W., distant 3 miles, and Moratabas point S. 54° W.; it lies in a depth of about 3½ fathoms.

**Directions.**—From the westward a vessel may pass either seaward or within Cruizer rock, situated 3½ miles off Tanjung Sipang. The entrance is not practicable at night. Po point light is obscured southward of Cruizer rock, so that with the light well in sight, bearing southward of S.E. ¾ E., a vessel will pass northward of it, and may anchor north-eastward of the light in a depth of from 7 to 9 fathoms during fine weather. It is advisable to employ a pilot for the river.

In entering this river, to guard against the effects of the tide, frequent bearings of Po and Moratabas points should be taken, which will readily show the vessel's position. The centre of the fairway is about three-quarters of a mile off White rock,\* or one mile eastward of Po point lighthouse. The clearest channel appears to lie eastward of the Scout and other central patches (*see page 136*), to enter by which, from a position three-quarters of a mile off White rock steer S.S.E., allowing for tide, until past the Scout patch, then head for the clump of trees, south-eastward of Brooke point on a bearing of S.S.W. ½ W.; having passed 2 or 2½ cables from the red buoy (if in position) steer for McDougall point when it bears S.W. by W. ¼ W.; this will lead across the bar and to abreast Moratabas point.

If passing westward of Scout patch and of the 14-feet patch to the southward of it, when one mile eastward of Po point lighthouse, steer South, allowing for tide, to pass along the 3-fathoms edge of the flat forming the west side of the channel, and after passing 2 or 2½ cables eastward of the buoy, proceed as above. This passage is very narrow and the flat is reported to be shoaling.

As in all rivers, the deeper water will usually be found in the bends, and the dangers off the points. The Nipa palm side has usually deep water, whereas the mangrove trees often have banks off them.

From abreast Moratabas point keep towards the southern shore, to avoid Moratabas and Belcher rocks, which lie on either side of a small creek on the northern shore. (Otter rock, charted in mid-channel, is not known to the officials or natives.) A beacon stands on the northern shore to mark the Moratabas rocks, with the word "Rocks off here" on it; it is not visible from seaward. From McDougall point (having given a berth to the 3-fathoms patch eastward of it) to Renard point there are no dangers known to exist, except the small 3-fathoms bank at the entrance of a creek south-westward of McDougall point on the opposite shore, and the shingle bank which extends a short distance a little eastward of Renard point.

Chart, 1,822  
[2,585]  
Var. 2° E.

\*Lat. 1° 43' N.  
Long. 110° 31' E.

Lat. 1° 37' N.  
Long. 110° 27' E.

Chart 1,822  
[2,585].  
Var. 2° E.

Between Renard point and Sinjinkat village the mid-channel depths are reported to be only from 3 to  $3\frac{1}{2}$  fathoms at low water; and a bank 2 cables in extent with only  $2\frac{1}{2}$  fathoms on it at low water, is said to lie in mid-channel half a mile south-westward from Renard point.

The mouth of the Riam river must be avoided, as a spit extends off and continues some way westward of it; a mid-channel course will give plenty of water. When Sinjinkat hill begins to be hidden by the trees on the south side of the river, that side should be neared a little, in order to avoid a 2-fathoms bank which projects from the opposite side; from thence to the Kwop river the only shoal is a patch with 3 to 4 fathoms water on it, lying east of Burney point in mid-channel.

Lat.  $1^{\circ} 33' N.$   
Long.  $110^{\circ} 24' E.$

**Kwop anchorage.**—The best anchorage is in 6 fathoms, with Burney point W.N.W., at about one-third the breadth of the river from the south shore. The holding ground from this to the junction is bad.

**Tide.**—The ebb stream runs out of the Kwop river at the rate of  $2\frac{1}{2}$  to 3 knots, and the flood at  $1\frac{1}{2}$  to 2 knots.

**Beacon.**—There is a beacon on Tree point at the junction of the Kwop and Sarawak rivers; it is marked "To Kuching."

**Signals.**—A signal station (white signal mast with yard, and a native hut), in telephonic communication with Kuching, is established near Tree point. A red ball hoisted here indicates that vessels can proceed up to Kuching. A black ball above a shape in the form of an anchor, denotes that the incoming vessel must anchor, an outgoing vessel being in the channel. When the latter signal is replaced by a red ball the incoming vessel can leave for Kuching.

**Rock.**—Near the junction of the Kwop with Sarawak river, a rock is said to exist within 20 yards of the left bank of the branch leading to Sarawak (apparently above Burney point).

**Caution.**—Vessels drawing more than 15 feet water, or of greater length than 200 feet, cannot go above the Kwop without incurring considerable risk, as before stated.

About one-third of a mile above Tree point in the Kwop river, is a rock with 3 fathoms water over it, situated a short distance south-eastward of mid-stream; off the first point above, distant half a mile from Tree point, are three rocks which show at low water springs, the positions of which have not been accurately determined. A road has been made to Kuching from the bank of the Kwop river, at a place about 4 cables south-west of Tree point.

**Coal** can be obtained at Kuching and put on board at Kwop anchorage; it is brought down the river in lighters. The native coal is good for raising steam, but burns quickly.

**Above Kwop anchorage.**—See pilots, page 135.

General chart, 2,660a [2,678].

**Directions.**—If proceeding up to Kuching without assistance, from Kwop anchorage, keep toward the bend northward of Tree point, avoiding Pendang rock with 6 feet water at the point of the creek of that name. Continue on that side along the Nipa palms until above Edwards point; then cross over keeping to the Nipa palms on that side to avoid the mud bank off Cameron point, until nearly up to Middle point.

Abreast Middle point is North Junction point, with the Santubong branch between; it is known as Sarawak junction. The flood streams meet and the ebb streams separate at this point, requiring care when passing.

When nearly up to Middle point keep in mid-channel to avoid being set towards the bank off North junction point. Here the sharp peak of Seol will be seen up the reach leading to Kuching, bearing about W.  $\frac{1}{4}$  N.

A short distance above North Junction point are some rocks with 5 feet water lying about 30 yards from the shore. A beacon, marked "Rocks—keep mid river," stands on the river bank north of the rocks.

From the Junction to Lumley point the river is clear on both sides with the exception of a one-fathom bank, which extends about 20 yards from the shore abreast the huts westward of Bradshaw point. A short distance to the westward of these huts there is a 2-fathoms bank in mid-channel, the deepest water being on the south side of the river, which is therefore the best side to keep until nearing Lumley point; then a vessel should keep in mid-channel, between the Bintawak rocks and the Rowley rocks 4 cables above them on the north shore, and the Prima Donna rocks and the sandbank fronting the shore westward to Rowley point on the south shore, giving a berth to each group when abreast them.

There is a beacon on the shore abreast the Bintawak rocks marked "Rocks—keep mid-river."

The Bintawak rocks, dry at low water, and the Prima Donna rocks have 2 feet over them both extending about one-third of the distance across the river. The outermost of the three Rowley rocks has 6 feet water, and lies 90 feet from high-water mark.

When Rowley point is rounded and the next reach is fairly open, edge over to the eastern side of the river, and keep close along it until above Tanah Puti, to avoid Horseshoe spit, which extends nearly two-thirds of the distance across the river; this spit is composed of soft mud and begins to show soon after half ebb. The marks for the direction of this channel are a cross board beacon on the eastern shore abreast Warren point; a cross board beacon on the sand spit, about  $1\frac{1}{2}$  cables to the westward of Warren point and north of Dido rocks, with "Hug this on the outside" written on it; and a cross board beacon on the south shore, nearly three-quarters of a mile West from Warren point. The Dido rocks lie just west of the shingle bank abreast Warren point. One or two of the rocks, in

Chart, 1,882

[2,585].

Var. 3° E.

Lat. 1° 33 $\frac{1}{4}$  N.  
Long. 110° 22 $\frac{1}{4}$  E.

mid-channel show at very low tides ; those nearest the south bank have 2 fathoms water over them. Their position may be known by a few houses which bear about S. by E. from them.

From abreast the beacon about 3 cables above Tanah Puti,\* steer across the river for the beacon on the sandspit on the north shore westward of Warren point, through New channel northward of Dido rocks, in depths of not less than 2½ fathoms at low water ; thence steer for the beacon on the south side of the river, so as to pass southward of Samarang rocks.

The Samarang rocks, situated in the fairway nearly a mile above Warren point, are 50 yards in length, and uncover about 3 feet at low water springs. About thirty yards east-north-east of them are two flat rocks, one having 5 feet, and the other about 8 feet over it at low water springs, rendering the channel northward of the rocks too narrow for safe navigation. A pinnacle rock, with 9 feet at low water, lies 80 yards from the north shore abreast the upper end of Samarang rocks. A beacon is situated on the south side of the river abreast Samarang rocks, on which is written "Rocks—hug this shore."

On the south side of the river off the sago factory there are some rocks marked with a beacon, on which is written "Keep mid-channel." About one cable above it is a small sunken rock, and from the shore abreast, Murphy rocks, dry at low water springs, extend 25 yards from low water mark.

The fort, built on a hill 60 feet high, comes in sight after rounding Warren point. It is a conspicuous object, with a house in it.

Some rocks fringe the shore below the fort hill on its western side ; and a detached rock lies near the shore between the Rajah's landing place and the creek northward of it.

A pinnacle rock with 5 feet water and steep-to, lies 35 yards off the market landing place at Crookshank point with a shallow mudbank extending east from the rock ; this is a portion of the bank that formerly existed off the point.

Considerable change has taken place here and in other parts of the river since it was roughly surveyed ; it is reported that in many places there is less water than shown on the chart, notably in the narrows off Lumley and Warren points, and off Astana.

Lat. 1° 33 $\frac{1}{4}$  N.  
Long. 110° 21 $\frac{1}{4}$  E.

**Anchorage.**—The best anchorage is a little below the sago factory in the reach between Samarang rocks and the fort on north side. As the river is only about one cable wide, vessels should moor a short distance on either side of mid-river with a stern hawser to the opposite shore to ensure swinging in that direction as the tide turns. Vessels must not neglect the precaution of mooring, wherever they may select a berth. Only small vessels should go higher up, as the river is narrower, the bottom indifferent, and the tidal streams stronger. H.M. ships *Mutine*

and *Rosario* berthed between Crookshank and Henderson points, least depth at low water when swinging  $2\frac{3}{4}$  fathoms. Ebb ran for 7 hours, <sup>Chart, 1,823  
[2,585]</sup> Var. 2° E. flood 5 hours.

**Signal.**—A black ball hoisted at the jail tower signifies that an incoming vessel is in the channel, and no vessel must proceed down the river until this signal is lowered. When no signal is hoisted the channel is clear.

**The SANTUBONG ENTRANCE. — Depths.** — This entrance, situated on the west side of the peninsula, is fronted by a bar about 2 miles across, the 3-fathoms edge of which is about 5 miles seaward of Kra island near the entrance.

This bar has a depth of about 13 feet at low water, and 23 feet at high water springs; 17 feet at low water neaps, and 19 feet at high water neaps. From the sandy nature of the bottom, or during freshets, it is possibly subject to change; it is not available during the north-east monsoon period; *see* caution, page 136.

Lat. 1° 48' N.  
Long. 110° 16 $\frac{1}{2}$ ' E.

**Dangers in entrance.—Kra island** lies about a mile south-west of Cross point, the north side of the entrance. Rainbow reef and Royalist rock, both with less than 6 feet water, lie half a mile northward of the island, on the south side of the fairway.

Lat. 1° 42' N.  
Long. 110° 18' E.

On the east side of the approach, a bank, dry at low water, extends considerably beyond the line joining Alligator and Cross points. The Nap rocks, covered at high water, lie near its edge. The coast northward of Alligator point is fronted by sunken rocks for which, and for the dangers in the river, *see* the plan.

**Directions.**—In approaching the Santubong entrance from the westward, mount Santubong\* may be steered for, when bearing S.E.  $\frac{1}{2}$  E., until the extreme of Tanjong Sipang bears E. by N.  $\frac{1}{2}$  N., when the vessel will be in the fairway for the bar. If the weather be fine, with the sun shining, the sandy beach behind Kra island will show very distinctly from 5 miles distant. Southward of Kra are two cones, the north and south Haycocks. The north Haycock, well open westward of Kra, bearing S.S.E., leads over the bar and up the fairway to abreast Cross point at the entrance.

\*Lat. 1° 43 $\frac{1}{2}$ ' N.  
Long. 110° 19 $\frac{1}{2}$ ' E.

With Cross point bearing about E. by S., the river will begin to open out, when course should be gradually hauled to the eastward, steering for the middle of the entrance when it is well open, to give a berth to Royalist rock and Rainbow reef on the south side. With the flood, the turn should be made in good time to avoid being set on to those dangers; the flood also sets eastward across the bar and must be allowed for; the ebb sets in the contrary direction. The streams increase in velocity directly the river is entered. Between the entrance and its junction with the Moratabas, the eye and the chart must be the guide.

Chart, 1,822  
[2,585].  
Var. 3° E.

North Junction point has a bank extending nearly two-thirds of the distance across to Middle point.

The bank fronting Serail river, and its off-lying patches, extend considerably across the channel, so that a vessel must pass close in the opposite shore; a bank also extends about two-thirds of the distance across the channel from North Junction point, necessitating keeping close in to the bank on the opposite side nearly up to Middle point. The vessel will then be in the main river, and the sharp peak of Seol will then be seen bearing W.  $\frac{3}{4}$  N., in the fairway of the river to Kuching, and should be steered for as directed on page 139, for the Moratabas.

The tidal streams meet and separate at the junction, requiring care when passing it.

**Serail bank** in the mouth of the Serail, in the Santubong branch,  $1\frac{1}{2}$  miles below the junction, is a mud bank covered with sand, forming an excellent spot to ground a vessel on; it is very flat with a depth of 12 to 16 feet over it at high water, and remains dry for about 3 hours.

Lat.  $1^{\circ} 34' N.$   
Long.  $110^{\circ} 21' E.$

**TOWN OF KUCHING or SARAWAK.**—The principal part of the town is on the south bank of the river, where there is a good bazaar and market. The church and bishop's residence are also on this side of the river; and close to the jail, which stands on Crookshank point, are the post office, treasury, and other government offices. The Resident lives some distance inland behind the town.

The Astana or house of the Rajah, is prettily situated on a small elevation above the fort on the north side of the river, with bungalows near it for the use of his staff. For an account of Sarawak State, see page 9.

**Population.**—The population of Kuching, in 1887, was 20,000, consisting chiefly of Malays and Chinamen, most of the trade being in the hands of the latter.

In 1903 the Europeans with their families numbered 120.

**Position.**—The fort on the north side of the river is in lat.  $1^{\circ} 33' 54''$  N., long.  $110^{\circ} 20' 47''$  E.

**Trade.**—The chief exports are sago, gambier, gutta percha, pepper, rattans, and copra, the total value, in 1903, amounting to 7,512,440 dollars; the imports comprise hardware, oils, opium, rice, salt, tobacco, &c.; total value, in the same year was 5,849,629 dollars. This does not include the coasting trade which amounted to, exports, 1,931,512 dollars; imports, 2,323,364 dollars. The trade is entirely in the hands of Chinese and Oriental merchants, and is confined to the ports of Singapore and Hong Kong.

The total tonnage entering the port in 1902 amounted to 104,450 tons.

A harbour due of five cents per register ton is levied upon all ships or square-rigged vessels entering the port; no charge on leaving.

**Supplies.**—**Coal.**—Beef, fowls, sweet-potatoes and other vegetables can be obtained. Should coal be required, it can be procured in two days by local steamers, from the mines in Sadong river, page 138.

Charts, 1,892  
[2,585], 1,746  
[2,584], 2,106  
[2,586].  
Var. 2° E.

Seamen are admitted into the government hospital when necessary.

**Rainfall.**—About 160 inches is the mean annual rainfall. Of this amount about 90 inches falls in the months of November to March; the month of least rain is about July, with 5 inches; the maximum about January, with 27 inches.

**Communication.**—There are regular steamers running every week between Kuching and Singapore. Mails take 30 to 35 days from England. Telegrams are sent by post via Singapore or Labúnn.

**COAST.**—**Sadong river** is situated about 15 miles eastward of the Saráwak, and is available for light river craft.

Lat. 1° 34' N.  
Long. 110° 46' E.

The government coal mines are situated at Simunjan about 18 miles up the river; these mines are extensively worked, and the coal, which is used by all the local steamers, is said to be of good quality. The output at Sadong colliery in 1902, was 12,468 tons, a great decrease from previous years.

**Lupar river** lies about 12 miles eastward of Sadong river. The river abreast Tiriso point, 2 miles within the entrance is about two miles wide, with a passage on either side of an island in the fairway abreast. About 3 miles seaward of the island is the inner edge of the bar, which is about 8 miles in width with a depth of 7 feet over it at low water. The edge of the 5-fathoms line is charted 17 miles seaward of the island in the entrance.

**Landmarks.**—Burong island,\* 350 feet high, lies about 3 miles off the western point of approach to the river. Bliong hill, 804 feet in height, is situated on the west side of the entrance, and with West peak, 1,430 feet in height, midway between it and Sadong river will serve to easily identify the Lupar.

**Directions.**—The broad bar or mud flat was found to have fairly even depths, but it is apparently a little deeper and the bottom softer along the south shore.

To enter this river, steer in with Burong island bearing S.S.E.; pass on either side of the island at a prudent distance, thence towards and along the southern shore and on either side of the island in the entrance. Most of the points in the river have spits extending off them, the bends therefore should be followed.

There is sufficient water in the river for craft that can pass the bar to reach Palabahan, about 24 miles up. Patusan village is about 18 miles farther up, but the depth of water is apparently not more than 3 feet in

Chart, 2,106  
[2,686].  
Var. 2° E.

places. We have no information on this river other than is shown on the chart dated 1844-48.

**The bore** in this river is dangerous to boats, particularly off Nibung point, Aboi point, Siduku point, and under mount Tirau, and also in the Linga branch on the turn to Bantang. It comes in with the first of the flood; boats should seek shelter under the lee of the points when the flood makes.

Lat. 1° 43' N.  
Long. 111° 6' E.

**Sarebas river** lies 13 miles north-eastward of the Lumar. Its entrance has not been surveyed, but Commander Miall, H.M.S. *Mohawk*, 1858, who also entered the Rajang, remarks as follows:—"The Sarebas " is a larger river than the Rajang. In charge of a pilot, an Englishman " in the employ of the Rajah of Sarawak, we proceeded 40 miles up, " though at night. The soundings are regular and deep. The only " necessary precaution is to take the bends of the river, avoiding the " spits which extend off the points.

"The pilot did not consider the river sufficiently clear of dangers to " proceed further in the vessel, but the boats went on to the fort some " 30 miles higher up. The last 20 miles is very meandering and narrow, " but the water is very deep."

**RAJANG RIVER**, in the neighbourhood of which the land is very low, lies about 45 miles north-eastward of the Sarawak. It is navigable for a vessel of at least 12 feet draught as far as Seriki, 25 miles from its mouth, and probably for short vessels of 20 feet draught, if properly surveyed. H.M.S. *Mohawk*, of 12½ feet draught, ascended to that place in 1858, and anchored off it in 6½ fathoms. It is navigable for light draught steamers to Kapit, 90 miles above Sibal, and about 150 miles above its mouth. The average width of the river is about half a mile with the exception of the narrow reaches near Seriki, and the general depth 3 to 10 fathoms. There is a depth of 9 feet only at low water in a bend about 45 miles from its entrance, and 7 feet in a rapid about 4 miles below its junction with the Baleh and Balui rivers.

Lat. 2° 9' N.  
Long. 111° 9' E.

**The bar.**—The entrance is about 3 miles wide between Jerri point on the north side and the point abreast it. Within the south point is a large island or islands which reduce the main river to about a mile in width, in which are depths of 5 to 10 fathoms. The outer edge of the bar, which is about one mile across, lies 3 miles seaward of Jerri point and has a low water depth of 2½ to 3 fathoms.

**Directions.**—The bar (surveyed in 1847) is apparently fairly even, with not less than 15 feet at low water; the south point of the river (Sabrang point) within the entrance, in line with Jerri point, bearing East, is given as the best mark; but from the northward the Lalang

branch seen open, bearing S.  $54^{\circ}$  E., is said to lead in, in about the same depth. In 1902 Jerri point, bearing E.S.E., was reported to lead in the deepest channel over the bar. Chart, 2,106  
[2,580]  
Var. 2° 2' E.

Within the bar the water deepens to 5 and 7 fathoms abreast Jerri point, where vessels may anchor. Proceeding farther up, the bends should be followed and the points, off which there are generally banks, avoided, as in most rivers. In the narrow reaches near Seriki, care is requisite when rounding the points, as also from the strength of the tidal stream. Lat. 2° 9' N.  
Long. 111° 33' E.

**Tides.**—It is high water, full and change, at the mouth of the Rajang at 4h. 45m.; rise from 9 to 13 feet. The tidal streams, both in this river and the Sarebas, are strong.

**The town** of Sibu, situated about 60 miles above the mouth of the Rajang, is one of some importance. It has a population of about 4,000; and the people in the river and its tributaries are estimated at 100,000, and to be steadily increasing. The majority of these are Dyaks. There are two small stations between Sibu and Kapit, at one of which, Kanowit, is a Roman Catholic mission.

**Trade** is carried on by small schooners, with an occasional visit of one of the Rajah's steamers. Timber is also shipped to Hong Kong by sailing vessels.

**Balui river**, about 6 miles northward of Rajang river, is apparently unimportant; the shallow bank fronting it extends off to the distance of 3 miles.

**Palo river**, nearly 20 miles northward of the Rajang, is about  $1\frac{1}{2}$  miles wide in the entrance, and fronted by shallow banks to a distance of 4 or 5 miles; a sand islet is situated on the spit which extends about 2 miles northward of the south point. It is apparently available for small craft with local knowledge, but it would not be safe to attempt the entrance except in a boat, by the present chart.

**CAPE SIRIK**, the western entrance point to Brum river, is low and dangerous, with shallow banks extending to the distance of 5 miles in a westerly direction, and possibly 8 miles to the northward. Vessels should not approach this point into less than 12 fathoms, as the soundings decrease rapidly from that depth to 4 fathoms and less. Lat. 2° 45' N.  
Long. 111° 21' E.

This point appears to be extending to the northward, and there are trees growing up for some distance beyond the lighthouse in that direction.

**LIGHT.**—From the lighthouse near the north extreme of cape Sirik, a *fixed white* light is exhibited at an elevation of 80 feet above high water, visible in clear weather from a distance of 15 miles.

**Tides.—Directions.**—It is high water, full and change, at cape Sirik at 3h.; springs rise about 11 feet.

Chart, 2,106  
[2,686].  
Var. 2° E.

places. We have no information on this river other than is shown on the chart dated 1844-48.

**The bore** in this river is dangerous to boats, particularly off Nibung point, Aboi point, Siduku point, and under mount Tirau, and also in the Linga branch on the turn to Bantang. It comes in with the first of the flood; boats should seek shelter under the lee of the points when the flood makes.

Lat. 1° 43' N.  
Long. 111° 6' E.

**Sarebas river** lies 13 miles north-eastward of the Lumar. Its entrance has not been surveyed, but Commander Miall, H.M.S. *Mohawk*, 1858, who also entered the Rajang, remarks as follows:—"The Sarebas " is a larger river than the Rajang. In charge of a pilot, an Englishman " in the employ of the Rajah of Sarawak, we proceeded 40 miles up, " though at night. The soundings are regular and deep. The only " necessary precaution is to take the bends of the river, avoiding the " spits which extend off the points.

"The pilot did not consider the river sufficiently clear of dangers to " proceed further in the vessel, but the boats went on to the fort some " 30 miles higher up. The last 20 miles is very meandering and narrow, " but the water is very deep."

**RAJANG RIVER**, in the neighbourhood of which the land is very low, lies about 45 miles north-eastward of the Sarawak. It is navigable for a vessel of at least 12 feet draught as far as Seriki, 25 miles from its mouth, and probably for short vessels of 20 feet draught, if properly surveyed. H.M.S. *Mohawk*, of 12½ feet draught, ascended to that place in 1858, and anchored off it in 6½ fathoms. It is navigable for light draught steamers to Kapit, 90 miles above Sibal, and about 150 miles above its mouth. The average width of the river is about half a mile with the exception of the narrow reaches near Seriki, and the general depth 3 to 10 fathoms. There is a depth of 9 feet only at low water in a bend about 45 miles from its entrance, and 7 feet in a rapid about 4 miles below its junction with the Baleh and Balui rivers.

Lat. 2° 9' N.  
Long. 111° 9' E.

**The bar.**—The entrance is about 3 miles wide between Jerri point on the north side and the point abreast it. Within the south point is a large island or islands which reduce the main river to about a mile in width, in which are depths of 5 to 10 fathoms. The outer edge of the bar, which is about one mile across, lies 3 miles seaward of Jerri point and has a low water depth of 2½ to 3 fathoms.

**Directions.**—The bar (surveyed in 1847) is apparently fairly even, with not less than 15 feet at low water; the south point of the river (Sabrang point) within the entrance, in line with Jerri point, bearing East, is given as the best mark; but from the northward the Lalang

branch seen open, bearing S.  $54^{\circ}$  E., is said to lead in, in about the same depth. In 1902 Jerri point, bearing E.S.E., was reported to lead in the deepest channel over the bar. Chart, 2,106  
[2,580].  
Var.  $3^{\circ}$  E.

Within the bar the water deepens to 5 and 7 fathoms abreast Jerri point, where vessels may anchor. Proceeding farther up, the bends should be followed and the points, off which there are generally banks, avoided, as in most rivers. In the narrow reaches near Seriki, care is requisite when rounding the points, as also from the strength of the tidal stream. Lat.  $2^{\circ} 9'$  N.  
Long.  $111^{\circ} 33'$  E.

**Tides.**—It is high water, full and change, at the mouth of the Rajang at 4h. 45m.; rise from 9 to 13 feet. The tidal streams, both in this river and the Sarebas, are strong.

**The town** of Sibu, situated about 60 miles above the mouth of the Rajang, is one of some importance. It has a population of about 4,000; and the people in the river and its tributaries are estimated at 100,000, and to be steadily increasing. The majority of these are Dyaks. There are two small stations between Sibu and Kapit, at one of which, Kanowit, is a Roman Catholic mission.

**Trade** is carried on by small schooners, with an occasional visit of one of the Rajah's steamers. Timber is also shipped to Hong Kong by sailing vessels.

**Balui river**, about 6 miles northward of Rajang river, is apparently unimportant; the shallow bank fronting it extends off to the distance of 3 miles.

**Palo river**, nearly 20 miles northward of the Rajang, is about  $1\frac{1}{2}$  miles wide in the entrance, and fronted by shallow banks to a distance of 4 or 5 miles; a sand islet is situated on the spit which extends about 2 miles northward of the south point. It is apparently available for small craft with local knowledge, but it would not be safe to attempt the entrance except in a boat, by the present chart.

**CAPE SIRIK**, the western entrance point to Brum river, is low and dangerous, with shallow banks extending to the distance of 5 miles in a westerly direction, and possibly 8 miles to the northward. Vessels should not approach this point into less than 12 fathoms, as the soundings decrease rapidly from that depth to 4 fathoms and less. Lat.  $2^{\circ} 45'$  N.  
Long.  $111^{\circ} 21'$  E.

This point appears to be extending to the northward, and there are trees growing up for some distance beyond the lighthouse in that direction.

**LIGHT.**—From the lighthouse near the north extreme of cape Sirik, a *fixed white* light is exhibited at an elevation of 80 feet above high water, visible in clear weather from a distance of 15 miles.

**Tides.—Directions.**—It is high water, full and change, at cape Sirik at 3h.; springs rise about 11 feet.

Charts. 2,106  
[2,586], 2,107  
2,587].  
Var. 2° E.

The tidal streams in the offing set north-eastward and south-westward, but inshore follow more closely the direction of the coast; westward of cape Sirik they will be found to run north and south with a velocity of 2 or 3 knots an hour; eastward of the cape the flood sets eastward and the ebb westward. This change in the direction of the flood from north to east must be guarded against when coming from the southward around the cape; there are tide-rips and overfalls near the shallows off the cape, especially on the flood,

There are no known dangers in the offing eastward of cape Sirik, but working against either monsoon vessels will have more regular tides by keeping towards the coast. They should always be prepared to anchor as soon as it is evident that they cannot make ground to windward.

Lat. 2° 46' N.  
Long. 111° 24' E..

**Bruit river** eastward of cape Sirik, is charted 3 miles wide at its entrance, with the village of Bruit on its western side. Two large islands lie in the entrance, on either side of which there appears to be a channel into the river. The bar apparently has about 7 to 9 feet at low water, but there is no information to hand other than that the chart affords.

**The COAST** between Igan point, 20 miles eastward of cape Sirik, to within 14 miles of Tatan point is low, the land cleared in places, and in others covered with trees, the tops of which may be visible in clear weather from a distance of about 12 to 15 miles. Villages are situated near the mouths of the several streams which discharge here.

A mud bank fronts the shore to a distance of about 2½ miles, with depths of less than 3 fathoms, but it has not been closely examined; there is, however, no reason for approaching it within a distance of 4 or 5 miles unless beating to windward, when apparently the lead would give sufficient warning of approach to this bank.

A fairway track may be taken at the distance of about 10 miles from the shore, in a depth of about 12 fathoms.

Lat. 2° 52' N.  
Long. 111° 41' E.

**Ballang** or Igan river, trends in a south-east and southerly direction about 50 miles where it joins the Rajang at Sibu. The entrance is narrow and fronted by the shore bank to the distance of 2½ miles. The average width of Ballang river is about two-thirds of a mile, with depths of 3 to 10 fathoms; at about 19 miles below the junction there is only 12 feet water in mid-river, but there is said to be 4 fathoms close to the right bank.

A clump of trees on Igan point, the west entrance point of the river, bearing South, until the river was well open, led into the river in 12 feet at average high water, in 1879. The village of Igan or Uri is about 2 miles within, on the northern bank.

To the eastward of the Ballang are the Oya, Panuit, and Juda, but they have not been sufficiently examined to be navigated except by boats.

**Caution.**—It should be kept in mind, that on all the exposed shores of Borneo, where swell prevails, that the stronger the stream of the river, particularly at the last of the ebb, the greater the liability to dangerous topping rollers. The time of half flood should be preferred for entering, and the last quarter flood for quitting all rivers having shoals to seaward.

Charts, 2,107  
[2,587], 2,108  
[2,588].  
Var. 2° E.

**The Muka** is the next important river in point of trade and population, but it has only a depth of 3 feet in its entrance at low water. To the eastward are the Tembongan, Nipa, and Tiding streams.

Lat. 2° 54' N.  
Long. 112° 5' E.

The town of Muka, situated at the mouth of the river, has a population of 8,000, nearly all of whom are engaged in the cultivation of sago. The population of the district is about 20,000. In the year 1888, 11,000 tons of sago, valued at 124,000 dollars, were exported.

**Coast.**—The mouth of the Neian, 32 miles eastward of the Muka, is obstructed by a bar upon which the depth is only 1½ feet; it offers no inducement to enter.

This is succeeded by the Tatan river, 4 miles westward of Tatan point, remarkable only for the peculiar mountain which stands within and gives its name to the river. Mount Tatan is 1,890 feet high and distant 10 miles from the entrance of the Tatan river.

Farther inland, south-westward of mount Tatan, is a ridge of hills, the most prominent of which is named Table hill. Between cape Sirik and this ridge the land is low.

**Ofling shoals.—Acis shoals** are two coral patches, with depths of 9 and 10 fathoms, discovered by the brigantine *Acis*. The position of the eastern shoal is given in the margin. The other shoal lies on the same parallel, and 6 miles to the westward.

Lat. 3° 45' N.  
Long. 112° 42' E.

The *Riflemen* anchored near the reported positions of these patches, and searched for them without success. It is possible they may exist somewhere in that locality.

**James shoal** with a depth of 12 fathoms, and 22 to 30 fathoms around, lies about 25 miles north-west of Acis shoals.

Lat. 4° 0' N.  
Long. 112° 18' E.

**COAST.—The Bintula**, another small river, had a depth of 5 feet in the new channel over the bar in 1879, with the west point of entrance bearing S.E. by S. The channel is marked by beacons on either side, but they are not to be depended on, and the bar is dangerous at times. Small craft should enter on the flood. Mount Tatan to the south-westward will serve to identify the entrance.

The river deepens within the bar. The town of Bintula at the entrance is a trading station.

**Tides.**—It is high water, full and change, at the entrance of the Bintula river, at 5h. 45m.; springs rise about 6 feet.

Charts, 2,108  
[2,588], 2,109  
[2,589].  
Lat.  $3^{\circ} 17' N.$   
Long.  $113^{\circ} 4' E.$   
Var.  $2^{\circ} E.$

**The coast.**—At 6 miles north-eastward of the Bintula is Kidorong point,\* within which fresh water can be obtainable from a creek. About 3 miles southward of the point is a round hill named mount Kidorong.

The coast thence to Breaker bay and beyond appears to be fronted by rocky ledges. Indeed this coast up to Bali point, should be avoided within depths of 12 fathoms by day, and 30 fathoms by night. Off Lubong point H.M.S. *Samarang* was within 3 miles of the white cliffs, when the depths suddenly decreased from 12 to 6 fathoms, and heavy breakers, with rocks above water, were noticed some distance off-shore.

**Niah** river discharges in about lat.  $4^{\circ}$  N.; the town of the same name is situated about 10 miles within the entrance.

**Bali point** is a cliffy point situated 14 miles southward of Barram point. Sunken rocks lie at 2 and 3 miles S.W. by W. of Bali point; others may exist southward of them. The Luak stream discharges just southward of the point.

Generally (in May) a current setting E.N.E. about one knot an hour was found in the offing. Close inshore the current frequently ran to the westward.

The principal objects along this coast are mount Silungan or Subis, 1,500 feet in height; and mount Lambier, elevated 1,550 feet.

**Meri river.**—At  $2\frac{1}{2}$  miles north-eastward of Bali point, is the mouth of the Meri river, on the southern bank of which is the village of Meri or Marabu, where a trade in beeswax and camphor is carried on with Singapore. The entrance to Meri river is barred, and the flat which fronts the shore extends nearly two miles off.

Lat.  $4^{\circ} 36' N.$   
Long.  $113^{\circ} 50' E.$

**BARRAM POINT** forms an abrupt bend of the coast, and is fringed by a shallow flat to the distance of 3 miles. A rock above water stands on the flat at about a mile westward of the point. The flat is fairly steep-to on its western side, but to the northward there is a bank with  $4\frac{1}{2}$  to 5 fathoms at about 5 miles off shore. There are apparently no outlying dangers; vessels working up may, therefore, stretch well off this point to the north-westward, so as to make a good board to the eastward.

**LIGHT.**—A *fixed white* light is exhibited from a white house on Barram point, visible in clear weather at the distance of 12 miles.

**BARRAM RIVER** discharges into the sea close northward of Barram point, and takes its source near that of the Rajang river and that of the Batang Kayan river (east coast), in about lat.  $2^{\circ} 40' N.$ , long.  $114^{\circ} 40' E.$ .

**Depths.**—The bar has a depth at low water of about 4 feet, and will admit vessels of about 7 feet draught in fine weather. It is dangerous

General chart, 2,660b [2,679].

at times. The banks on either side are washed away during the north-east monsoon and reform again during the south-west monsoon period. Within the bar the river has a depth of from 4 to 5 fathoms, and in some places up river as much as 20 fathoms.

Charts, 2,108  
[2,588], 2,100  
[2,589].  
Var. 2° E.

It is apparently navigable for steam vessels that can cross the bar at least as far as Claude town, about 60 miles up, and by craft of lighter draught up to Long Salai, some 60 or 70 miles above that town; here the rapids begin, but the river is navigable for native boats many miles beyond. Its principal tributary, the Tinja, is also navigable by light steam craft for about 60 or 70 miles above Claude town.

The land on either side of the mouth consists of alluvial deposits covered with casuarina trees and coarse grass; for the first 15 miles it is devoid of interest and, being low, is constantly flooded; the banks are bordered by the Nipa palm in places, which attain a height of 30 feet. For the next 15 miles the land is somewhat higher and covered with grass and jungle with but few inhabitants. At the mouth of the Bakong are a few farms with fruit trees and palms. A few miles above, a canal has been cut across a peninsula, shortening the distance for boats by 4 miles.

Lat. 4° 15' N.  
Long. 114° 21' E.

**Claude town**, about 60 miles from the mouth is situated on the first high land met with. It is the principal town of the district, a Government station, and possesses a fort elevated 50 feet above the level of the river, which commands the town. From the fort, mount Malu, 9,000 feet high, is visible to the eastward.

**Communication.—Trade.**—A Government steam launch is stationed here for river work. A small coastal mail steamer calls monthly, and other small steamers trade here. Mails are also left at the lighthouse at Barram point. The products of the district are rattans, gutta-percha, rubber, beeswax, camphor, and edible birds'-nests. Gold, cinnabar, silver, antimony, iron, and coal are also found here.

**Tides.**—The flood stream seldom reaches Claude town and the water is fresh out as far as the bar at times. During the visit of Lieutenant Gordon in April, 1847–9, there was a continuous downward current of nearly 3 knots an hour, but the range of the tide was apparently not above 3 feet.

**DANGERS in the main fairway to Palawan channel.**—**SOUTH LUCONIA SHOALS**, the south-westernmost dangers, are steep-to, and may usually be seen by the breakers over them. They comprise a group of five coral shoals, spread over a distance of about 14 miles in an east and west direction.

The southernmost shoal, about a mile in extent, is in the form of a horse-shoe; the general depths upon it are from 2 to 3 fathoms, but near

Lat. 4° 59' N.  
Long. 112° 39' E.

Chart. 2,100  
[2,589].  
Var. 2° E.

the north-west extreme is a rock nearly awash. From this danger Barram point bears E. by S.  $\frac{1}{2}$  S., and is distant 83 miles.

Lat. 5° 1' N.  
Long. 112° 30' E.

The westernmost shoal of the group, lying with its south-east end about W. by N., distant 7 miles from the southernmost one, is nearly 2 miles in length and about three-quarters of a mile in breadth. The general depths over it are from 2 to 3 fathoms, but near the south-east extreme is a rock just below the surface of the water, and a similar one at the north-west extreme.

About 4½ miles north-eastward of the southern shoal is a reef, nearly half a mile in extent, upon which the sea breaks even in fine weather; it lies on the eastern extreme of a shoal, with depths less than 5 fathoms, and is known as the Luconia breakers. The shoal extends nearly two miles in a north-westerly, and about a mile in a south-westerly direction from the centre of the breakers.

One mile north-eastward of the centre of the breakers is the south extreme of a narrow shoal 2 miles in length, with 2 to 3 fathoms water over it. About 2 miles westward of the last two shoals is a shoal with 5 fathoms water.

**NORTH LUCONIA SHOALS** cover a space about 40 miles in length in a north and south direction and about 20 miles from east to west; the space between them and the South Luconia group, and also that to the westward has apparently not been sounded and therefore should be given a wide berth. A depth of not less than 2 fathoms was found on the shoals northward of Seahorse breakers, but it is quite possible that shallow heads may have escaped the lead. The shoals as charted, lie between lat. 5° 20' N. and 6° 0' N., and long. 112° 20' E. and 112° 40' E. They were partially examined by the *Riflemen*, and were found to consist of a mass of coral reefs and shoals amongst which no vessel should venture.

Lat. 5° 31' N.  
Long. 112° 34' E.

**Seahorse breakers**, the most conspicuous danger of the Luconia shoals, consists of a reef of rocks and sand just above water, about a mile in length, and one-third of a mile in breadth. From these breakers, shoals extended 18 miles northward, 5 miles southward, 5 miles eastward, and 13 miles westward.

At about 4 miles south-eastward and the same distance south-westward are the southern and eastern extremes of shoals which are nearly always marked by breakers.

A reef upon which heavy breakers were seen is charted 10 miles S. by E.  $\frac{1}{2}$  E. of Seahorse breakers.

Lat. 5° 55' N.  
Long. 112° 31' E.

The northernmost of the shoal patches surveyed by the *Riflemen* is a 2½-fathoms patch, on the northern edge of a coral bank traced for 2 miles; its extent was not defined.

**Friendship shoal** is the northernmost of the Luconia group; the *Riflemen* crossed it without getting less than  $4\frac{1}{2}$  fathoms, although there appeared to be less depths in some places. The north part of the shoal is approximately in the marginal position.

**LOUISA REEF**, the south-west rock of which was found by H.M.S. *Royalist*, in October 1851, to be in the position given in the margin, is a dangerous coral reef, two-thirds of a mile in extent from east to west. The rocks on it are generally covered at high water, with the exception of two clusters on its eastern and south-western extremes. There is no bottom at 50 fathoms close to its edge.

The tidal stream at the Louisa reef at noon, on the full and change days in the month of October, was setting to the W.N.W.; the maximum rise of tide here appeared to be 4 feet.

**ROYAL CHARLOTTE REEF**, of a nearly rectangular shape, is about a mile in extent. On the south-eastern side are stones 2 to 4 feet above high water\*; there are also some on its north-east edge just showing at that time.

**SWALLOW REEF**, formed of a belt of coral surrounding a shallow basin of water, is  $3\frac{3}{4}$  miles in length, east and west, by  $1\frac{1}{2}$  miles in breadth. At its eastern part are some rocks from 5 to 10 feet above high water, the highest of which is in the position given in the margin; there are also some rocks on the south-eastern side, just visible then.

**ARDASIER BANK**, which is very extensive, has only received a partial examination; it is probable that the South Ardasier, Gloucester, and North Ardasier breakers, as also the breakers seen in 1860, are shoal patches on different parts of one large bank; see page 246. The south-eastern side, which forms one of the northern limits of the approach to the Palawan passage, was surveyed in the *Riflemen*; the general direction of this part is east-north-east and west-south-west for a distance of 20 miles, but the outline of the edge is irregular. Several patches of 3 to 5 fathoms were found near the edge; the shoalest part discovered had  $2\frac{1}{4}$  fathoms water,\* and lies near the position ascribed to South Ardasier breakers.

For dangerous ground northward and north-eastward, see pages 246-251.

The COAST from Barram point eastwards for 45 miles is very low, and intersected by numerous creeks; at 36 miles from the point is the entrance of Tutong river (Ampa), where there is some trade. This coast has not been sounded, and should be given a wide berth.

\*Lat.  $5^{\circ} 59' N.$   
Long.  $112^{\circ} 31' E.$   
Var.  $2^{\circ} E.$

\*Lat.  $6^{\circ} 57' N.$   
Long.  $113^{\circ} 35' E.$

Lat.  $7^{\circ} 23' N.$   
Long.  $113^{\circ} 50' E.$

\*Lat.  $7^{\circ} 36' N.$   
Long.  $114^{\circ} 10' E.$

Charts, 2,109  
[2,589], 2,134  
[2,592].  
Lat. 4° 56 $\frac{1}{4}$ ' N.  
Long. 114° 50 $\frac{1}{4}$ ' E.  
Var. 2° E.

**Bruni cliffs**, composed of sand covered with grass, are situated about 21 miles north-eastward of Tutong river, with some hills cleared of trees and 500 feet high about a mile within. Keti islet, situated about a third of a mile off the cliffs, is said to be visible at the distance of about 12 miles.

About 2 miles westward is Woody peak, 650 feet in height. From about 6 miles eastward of Tutong river the coast eastward has been surveyed; a bank with less than 3 fathoms fronts the coast to the distance of above a mile as far eastward as Bruni bluff, and there are many off-lying dangers which will be described.

Lat. 5° 3' N.  
Long. 115° 8' E.

**Bruni bluff and Pisang hill**.—Bruni bluff is an insignificant sandstone headland 35 feet high, forming the termination of the range of which Pisang hill, 540 feet in height and 2 miles within is the prominent feature; the bluff is covered with trees which makes its entire height about 100 feet. A ledge of rocks, partly covered at high water, extends off the bluff for a distance of half a cable. The coast to the eastward of the bluff forms a bay half a mile deep, the eastern extremity of which is Polompong point.

Lat. 4° 0' N.  
Long. 114° 57' E.

**Gunong Malu**, in the interior, is the highest mountain noticed in this part of Borneo. It rises in a conical form, slightly flattened at the apex, to an elevation of 9,000 feet, can be seen at a distance of 90 miles in clear weather, and is visible from Labúan to about 20 miles southward of Barram point, a range of 100 miles.

**OFF-LYING DANGERS.—Ampa patch**, of sand and coral, with a least known depth of 5 fathoms, is about five miles in length within a depth of 10 fathoms. Two patches of 5 fathoms are charted on it, bearing N.W., and N.W. by N., each 15 miles from the mouth of Tutong river. There may be less water, as a depth of 4 fathoms was said to have been obtained on Ampa patch, by H.M.S. *Magpie*, 1883.

Another spot of 5 fathoms is charted between these bearings 3 miles nearer the shore.

**Victoria patch**, lies 10 miles N. by E.  $\frac{1}{2}$  E. from the entrance of Tutong river, and 5 miles off shore, it is composed of coral, about a mile in extent, with two heads of 3 fathoms. At one mile westward there is a patch of  $2\frac{1}{2}$  fathoms with 6 fathoms between.

Lat. 4° 56 $\frac{1}{4}$ ' N.  
Long. 114° 38 $\frac{1}{4}$ ' E.

**Scout patch**, situated  $1\frac{1}{2}$  miles N. by E.  $\frac{1}{2}$  E. from Victoria patch, is composed of coral, and has a least depth of 2 fathoms, with 7 to 9 fathoms around. There are several heads with from  $4\frac{1}{2}$  to 5 fathoms water in the neighbourhood of Victoria and Scout patches.

**Bruni patches** are four or more coral patches about  $3\frac{1}{2}$  miles in extent, with depths of 2 to 3 fathoms and 6 to 7 fathoms around. From

the north end of the western patch, Keti islet bears E. by S.  $\frac{1}{2}$  S., distant 9 $\frac{1}{2}$  miles.

Charts, 2,100  
[2,589], 2,134  
[2,592]  
Var. 2° E.

**Iron Duke shoal.**—During the passage of H.M.S. *Iron Duke*, 1872, from Singapore to Labúan, soundings were obtained in 5 fathoms about 4 $\frac{1}{2}$  miles N.N.W. of the Bruni patches, with the eastern extreme of the Bruni cliffs, bearing S.E. by E.  $\frac{1}{2}$  E. The s.s. *Otterspool*, drawing 20 feet, touched here in June 1898; the depth on it has in consequence been altered to 3 fathoms.

**Two-fathoms rock**, of that depth, and with 7 to 10 fathoms around, lies with Bruni white cliffs bearing S.S.W.  $\frac{7}{8}$  W. and in line with Woody peak; and Bruni bluff S.E. by E.  $\frac{3}{4}$  E. 7 miles.

**Patches** of 3 fathoms and of 4 fathoms are situated, respectively, S.W.  $\frac{1}{2}$  W. 2 $\frac{3}{4}$  miles, and W.  $\frac{1}{2}$  N. 2 $\frac{1}{2}$  miles from Two-fathoms rock.

Other shoal heads probably exist in the approach to Bruni bay.

**Pelong rocks**, lying 2 miles north of Bruni bluff, are a group of sandstone rocks, the highest and largest of which is, including bushes, about 73 feet high. Around the rocks there is foul ground with coral heads, extending northward about 4 cables and south-eastward 3 cables from the highest rock.

**Abana rock**, a coral patch about 3 cables in extent, on which the s.s. *Abana* struck in 1898, has over it a depth of 4 fathoms; it is situated with the largest Pelong rock bearing S. 25° W., distant 2 $\frac{1}{2}$  miles, and Polompong point, S. 28° E.

**Buoy.**—A large iron can buoy, painted red, surmounted with staff and black globe, is moored on the shoalest part of the Abana rock.

There is a deep water passage between Abana rock and Pelong rocks, also between Abana rock and the south-west end of Barat bank (see page 154).

**Champion shoal.**—Soundings of 5 fathoms were obtained by H.M.S. *Champion*, 1883, on a shoal situated about 7 miles N.N.E.  $\frac{1}{2}$  E. from Iron Duke shoal.

**Colombo shoal**, with a depth of 5 $\frac{1}{2}$  fathoms, is charted N. by E.  $\frac{3}{4}$  E. 1 $\frac{3}{4}$  miles from Champion shoal.

**Labúan Trader shoal**, about 10 miles E. by N. of Champion shoal, is reported to have 5 fathoms water.

The positions of the Iron Duke and the last three mentioned shoals are approximate.

**Directions.**—There is no known danger in the track between cape Sirik and Barram point; neither are there any in the offing nearer than the Luconia shoals (page 149). Vessels working against the monsoons will

Charts, 2,107-09  
[2,587-89], 2,134  
[2,592].  
Var. 2° E.

find more regular tides in-shore, but they must guard against the indraught on the flood into the several rivers.

Between cape Sirik and Tatan point, 8 or 7 fathoms will be safe depths to stand into, but between Tatan and Barram points it does not appear to be safe to stand into less than 12 fathoms.

From Barram point to Labúan, or to the entrance of Bruni river, it is advisable to keep northward of Iron Duke shoal, Bruni patches, and Two-fathoms bank, keeping a good look-out aloft for any discoloured water, there being several patches of about 5 fathoms shown on the chart, the positions of which have not been accurately determined. The channel to Bruni bay between Pelong rocks and the patch of  $2\frac{1}{2}$  fathoms on the south-west edge of Barat bank, is 5 miles wide, with depths of 7 to 25 fathoms, except for Abana rock, described on page 153.

Woody peak, Pisang hill, and the islands of Rusukan, Kuraman, and the high land of Labúan afford useful marks, as they can be seen in time to avoid the several shoals, except during thick weather, which seldom occurs on this coast.

Vessels of light draught can pass inside the Bruni patches by keeping along the edge of the shore bank in 5 fathoms, but it is not recommended.

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General chart. 2,660*b* [2,679].

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## CHAPTER VI.

### NORTH-WEST COAST OF BORNEO.

#### BRUNI RIVER TO SAMPANMANGIO POINT.

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#### BRUNI RIVER AND APPROACHES.

**Bruni river approach.—General remarks.**—On Charts, 2,100 [2,589], 2,134 [2,592]. Var. 2° E.  
approaching the land from the north-west the first object seen in the neighbourhood of the Bruni river is Pisang mount, 540 feet high, and visible in clear weather at a distance of 25 miles. At 14 miles from the coast the trees at Polompong point\* come in view, and at 12 miles distant \*Lat. 5° 21' N.  
Long. 115° 54' E.  
the less compact trees of Muara island will be seen. A small but important group of casuarina trees which marks Sapo point, the south-eastern extreme of Muara island, is not seen until 8 miles distant from them. The aspect of the land about the mouth of the Bruni river is hilly and densely wooded; but in the neighbourhood of Sunda point, to the eastward, it is low and covered with mangrove forest without any relieving feature; mountains rise at the back, but they are many miles away.

In clear weather, the lofty peak of Gunong Malu is plainly visible.

The bay which receives the Bruni river encloses also Muara harbour, Muara island, and the joint streams of several small rivers. The greater portion of it is filled up with shallow flats of sand and mud, and extending to the eastward of Polompong point there is a long and dangerous spit of sand, which makes the approach to any part of the bay circuitous.

**Caution.**—Dead trees and logs of wood are met with many miles from the shore; and after heavy rains in the interior, miniature islands of earth and trees float down the rivers, and after advancing and receding with many successive tides, or occasionally becoming fixed during low water on some point or spit, eventually find their way out to sea.

**Navigable depths.**—The distance between Polompong and Sunda points, between which the several rivers discharge their waters, is 7 miles; but the actual channel is narrowed to one-third of this by Muara and Sunda spits.

The outer bar lies eastward of Muara spit, and can be crossed at high water by vessels of deep draught, there being a depth of 25 feet at low

Chart, 2,134  
[2,589].  
Var. 2° E.

water springs and 32 feet at high water springs in the fairway; neaps rise  $5\frac{1}{2}$  feet. Unless buoyed it is not considered safe for vessels above 24 feet draught, and then only after three-quarters flood and during clear weather, see page 157. Within the bar the depths increase to 6 and 8 fathoms to abreast Sapo point, Muara island.

The least depth to Brooketon is 13 feet on Muara bar, with depths of 6 to 7 fathoms off the town. It is available for vessels of 15 feet draught after half-flood, see page 160. Anson channel, the northern one, has about 7 feet; see page 161.

There is a least depth of about 8 feet over Bruni Inner bar; 15 feet is about the maximum safe draught that can go up at high water at the highest spring tide, and 12 feet at high water neaps; see page 165.

Lat. 5° 2' N.  
Long. 115° 3' E.

**LIGHT.**—A *fixed white* light is exhibited from a tripod on Brooketon hill, at an elevation of 218 feet above high water, S.  $\frac{1}{2}$  E., distant  $2\frac{8}{10}$  miles from Pelong rocks; the distance this light is visible in clear weather is said to be 15 miles; this, however, is doubtful; the light is reported to be unreliable.

**Bruni bluff** and the coast westward of it, and the Pelong rocks off it have been described in the preceding chapter.

**Polompong point.**—Eastward of Bruni bluff the low sandy shore forms a bay, terminating in Polompong point,  $2\frac{1}{2}$  miles to the eastward, the west point of entrance to Bruni river; it is composed of sand, is nearly awash at the highest spring tides, and is covered with drift wood. On the point is a compact grove of casuarina trees, 70 to 100 feet high, which extends westward for three-quarters of a mile, with trees about 60 feet high along shore beyond.

In Muara bay, situated south-westward of the point, is Brooketon.

Lat. 5° 1' N.  
Long. 115° 3' E.

**Pisang hill** is densely wooded, and has a well-defined summit formed by a high clump of trees, the top of which is 540 feet above the sea. On the ridge near Bruni bluff are the coal mines, with a tramway to Brooketon.

**Islands and dangers in the entrance.**—**Muara island** is flat and marshy,  $3\frac{1}{2}$  miles in length by one mile in breadth; there are a few inhabitants. The tops of the trees, which are more dense towards the east end of the island, vary in height from 60 to 100 feet. At Sapo point, the south-eastern end of the island, there is a small group of casuarinas, the easternmost of which is 45 feet high, and conspicuous from all points of view; see Anchorage, page 159.

**Points for deviation.**—A stake is driven into the ground S. 22° W. 18·5 feet from the high tree on Sapo point, which is in lat. 4° 59' 44" N., and long. 115° 7' 39" E. The summit of Kini Balu

mountain, distant 110 miles, which is frequently visible between daylight [Chart, 2,134  
and 8 a.m., bears N.  $52^{\circ} 56'$  E. (true) from it; and the less remarkable [2,502].  
Gunong Malu S.  $11^{\circ} 54'$  W. (true). These bearings may prove useful to  
vessels when swinging for deviation of the compasses. Var.  $2^{\circ}$  E.

**Muara spit** is formed of sand and extends in an E. by N.  $\frac{2}{3}$  N. direction from Polompong point for a distance of  $4\frac{1}{2}$  miles. As far as  $2\frac{1}{2}$  miles from the point, it is awash at low water spring tides: the depths then increase by a series of irregular banks to 12 feet at the end of it. Off the extreme eastern point of the spit there is a depth of 6 to 7 fathoms, mud. A tide ripple generally marks the end of the bank.

At the extreme of the spit, Sapo point is in line with the eastern side of Burbonet island, bearing S.W. by S., the former distant  $4\frac{6}{10}$  miles.

**Sunda point**, nearly  $4\frac{1}{2}$  miles east-south-eastward of Muara island, forms the east point of entrance to Bruni river; it is low and covered with forest, the tops of the trees varying in height from 70 to 100 feet. The coast on either side is fringed with mangrove and bordered with soft mud, beyond which is Sunda spit. Lat.  $4^{\circ} 58' N.$ . Long.  $115^{\circ} 11' E.$

This promontory, of which Sunda point is the north-western extremity, appears to be a sort of delta with many streams running through it. The land rises slightly away from the coast, attaining a height of about 150 feet.

**The Trusan river**, situated one-third of a mile south-west of Sunda point, is the principal stream in this locality; it is about 150 miles in length, and rises near the source of the Limbang river. Steam vessels of 6 feet draught can enter at high water by taking the course marked on the plan over Sunda flat. It forms the eastern boundary of the State of Sarawak.

**Sunda spit**, composed of sand and mud, dry at low water springs, extends  $2\frac{1}{2}$  miles north-west of Sunda point; at 3 cables beyond it there is a depth of 5 fathoms. The flat to the north-eastward, forming the eastern side of the entrance to Bruni river, is named Sunda bank.

**OUTER BAR.—Fairway dangers.**—Outer bar, between Muara spit and Sunda bank, is about  $2\frac{1}{2}$  miles wide, with a bottom of sand, and some mud in the deepest part. At the distance of three-quarters of a mile, and also at  $1\frac{1}{2}$  miles south-eastward of the north-east extreme of Muara spit, are a number of sand knolls; at the lesser distance the least depth found was 13 feet, and at the greater 17 feet. The channel eastward of them is about one mile wide, with a fairway depth of about 25 feet. With buoys laid down, vessels drawing 27 feet can cross at high water, but without buoys it is not safe for a vessel with a draught exceeding 24 feet, and then only at three-quarters flood, for it is possible that the knolls of sand do not remain exactly in the same positions after the freshets. Lat.  $5^{\circ} 3' N.$ . Long.  $115^{\circ} 12' E.$

Chart 2,134  
[2,592].  
Var.  $\frac{2}{3}$  E.

**Tides.**—The times and the heights of the tides on the Outer bar are believed to be the same as at Muara harbour, page 159. The flood stream on the Outer bar sets in  $1\frac{1}{4}$  hours after low water, and the ebb stream runs out about  $1\frac{1}{2}$  hours after high water, the rate at springs being from 2 to 3 knots. To seaward of the bar, the direction of the tidal streams has not been determined. Between the bar and Sapo point, the flood generally sets to the south-west; the ebb to the north-east.

**Caution.**—It is necessary that strict attention should be paid to the sextant angles mentioned in the following directions, especially in vessels of 20 feet draught and upwards.

Vessels drawing 20 feet water should not attempt the passage over the outer bar unless the islands, referred to in these directions, are plainly visible.

**Directions.**—Vessels of the draught just mentioned proceeding from Labúan to Bruni, having passed between Pappan and Enoe, should steer S. by W.  $\frac{3}{4}$  W., keeping the west extreme of Pappan bearing eastward of N. by E.  $\frac{3}{4}$  E., until the east extreme of Rusukan Besar is in line with the west extreme of Kuraman, bearing N.N.W.  $\frac{3}{4}$  W. At this position Pelong rocks should bear W.  $\frac{1}{4}$  S., southerly, and the angle between Pisang hill and Pelong rocks should be  $24^\circ$ .

Or, coming from the westward and having passed northward of Pelong rocks, steer to the eastward with the rocks, astern, bearing W.  $\frac{1}{4}$  S., until the above-mentioned position is attained. This place is marked on plan 2,134 [2,592].

\*Lat.  $5^\circ 14' N.$   
Long.  $115^\circ 11' E.$

From the above position make good a course S.  $\frac{1}{4}$  E., with Burong island\* astern on that bearing. After proceeding one mile, the angle between Pisang hill and the summit of Pelong rocks should be kept at about  $25^\circ 15'$ . It must not be allowed to become less than  $24^\circ 45'$  or more than  $25^\circ 45'$  until the marks next mentioned are on, to avoid Sunda bank to the eastward and the sand knolls with 17 feet water to the westward.

When Sapo point tree comes in line with the conspicuous bushy tree on Jaja ridge, bearing S.W. by W.  $\frac{1}{4}$  W. (see sketch A on plan), steer for those objects in line. At the point of turning, the west extreme of Rusukan Besar should bear N.N.W.  $\frac{1}{4}$  W.; and the angle between it and the new marks should be  $95^\circ$ .

When within one mile of Sapo point, steer to round it at a distance of 2 to 3 cables, and anchor as directed on page 159.

Vessels, of 17 feet draught and under, may cross the Outer bar when Sapo point tree is in line with the distant peak to the south of Kindana hill, bearing S.W. westerly. (See sketch D on plan.) Continuing on that line, they will pass close eastward of the edge of the long spit which projects in a north-easterly direction from Sapo point. With Sapo point,

General chart, 2,109 [2,589].

distant about one mile, they should steer to pass it at a distance of about 2 cables, and anchor under it as convenient.

Chart, 2,134  
[2,592].  
Var. 2° E.

Vessels of 12 feet draught and under, having nothing to apprehend when crossing any part of the Outer bar, even at low water, may round Muara spit by the safety angle, 30° between Pisang hill and Pelong high rock, and steer South until they are on the marks for clearing the spit north-east of Sapo point.

Directions for Muara bar and harbour will be found on page 161.

**Anchorage.**—There is good anchorage, protected from the sea, southward of Muara island, in 7 to 8 fathoms mud, with Sapo point bearing N.N.E., distant from 3 to 4 cables.

**MUARA HARBOUR**, situated between Muara island and the coast to the westward of it, is completely sheltered. It is 3 miles in length, from 2 to 4 cables in width, and has depths of 3 to 8½ fathoms, mud bottom. On the western shore is Brooketon village, occupied by the employés of the company who work the coal mines.

**Observation spot.**—The seaward corner of the north-eastern house of the village was used as an observation spot by the *Rambler*, and its position was ascertained to be as given in the margin.

**Pier.**—The pier has a depth of 14 feet alongside the end, at low-water spring tides; one vessel can lie alongside. The piles of the pier, which are slight, must not be used for hauling in.

**Coal** is obtained from the mines under Cowie hill, 193 feet in height, in the range extending from Bruni bluff to Pisang hill, about one mile from Muara harbour. The mines, which are considered to be practically inexhaustible, are connected by a tramway with the pier. The coal is light, very friable, but of good quality. Quantities from 500 to 2,000 tons are kept in store, under cover.

One hundred tons can be put on board a vessel alongside the pier in 12 hours. Two 50-ton schooners and a small tug are available for coaling vessels at the anchorage, and 60 tons can be put on board in 12 hours, the coal being taken off in bulk. The annual output of the Brooketon colliery in 1902 was 20,810 tons.

**Oil wells** are reported to exist in this neighbourhood, and a considerable export is anticipated.

**Supplies.**—Beef can be procured at Muara, but no bread or vegetables. Water can be obtained of good quality at a charge of about one dollar a ton.

**Tides.**—The tides in Muara harbour are influenced by a large diurnal inequality which varies during the lunation. The highest high tide of one day is succeeded by the lowest low tide (this is an invariable

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Or, coming from the westward and having passed northward of Pelong rocks, steer to the eastward with the rocks, astern, bearing W.  $\frac{1}{4}$  S., until the above-mentioned position is attained. This place is marked on plan 2,134 [2,592].

\*Lat.  $5^\circ 14' N.$   
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From the above position make good a course S.  $\frac{1}{4}$  E., with Burong island\* astern on that bearing. After proceeding one mile, the angle between Pisang hill and the summit of Pelong rocks should be kept at about  $25^\circ 15'$ . It must not be allowed to become less than  $24^\circ 45'$  or more than  $25^\circ 45'$  until the marks next mentioned are on, to avoid Sunda bank to the eastward and the sand knolls with 17 feet water to the westward.

When Sapo point tree comes in line with the conspicuous bushy tree on Jaja ridge, bearing S.W. by W.  $\frac{1}{4}$  W. (see sketch A on plan), steer for those objects in line. At the point of turning, the west extreme of Rusukan Besar should bear N.N.W.  $\frac{1}{4}$  W.; and the angle between it and the new marks should be  $95^\circ$ .

When within one mile of Sapo point, steer to round it at a distance of 2 to 3 cables, and anchor as directed on page 159.

Vessels, of 17 feet draught and under, may cross the Outer bar when Sapo point tree is in line with the distant peak to the south of Kindana hill, bearing S.W. westerly. (See sketch D on plan.) Continuing on that line, they will pass close eastward of the edge of the long spit which projects in a north-easterly direction from Sapo point. With Sapo point,

distant about one mile, they should steer to pass it at a distance of about 2 cables, and anchor under it as convenient.

Chart. 2,134  
[2,592].  
Var. 2<sup>d</sup> E.

Vessels of 12 feet draught and under, having nothing to apprehend when crossing any part of the Outer bar, even at low water, may round Muara spit by the safety angle, 30° between Pisang hill and Pelong high rock, and steer South until they are on the marks for clearing the spit north-east of Sapo point.

Directions for Muara bar and harbour will be found on page 161.

**Anchorage.**—There is good anchorage, protected from the sea, southward of Muara island, in 7 to 8 fathoms mud, with Sapo point bearing N.N.E., distant from 3 to 4 cables.

**MUARA HARBOUR**, situated between Muara island and the coast to the westward of it, is completely sheltered. It is 3 miles in length, from 2 to 4 cables in width, and has depths of 3 to 8½ fathoms, mud bottom. On the western shore is Brooketon village, occupied by the employés of the company who work the coal mines.

**Observation spot.**—The seaward corner of the north-eastern house of the village was used as an observation spot by the *Rambler*, and its position was ascertained to be as given in the margin.

**Pier.**—The pier has a depth of 14 feet alongside the end, at low-water spring tides; one vessel can lie alongside. The piles of the pier, which are slight, must not be used for hauling in.

**Coal** is obtained from the mines under Cowie hill, 193 feet in height, in the range extending from Bruni bluff to Pisang hill, about one mile from Muara harbour. The mines, which are considered to be practically inexhaustible, are connected by a tramway with the pier. The coal is light, very friable, but of good quality. Quantities from 500 to 2,000 tons are kept in store, under cover.

One hundred tons can be put on board a vessel alongside the pier in 12 hours. Two 50-ton schooners and a small tug are available for coaling vessels at the anchorage, and 60 tons can be put on board in 12 hours, the coal being taken off in bulk. The annual output of the Brooketon colliery in 1902 was 20,810 tons.

**Oil wells** are reported to exist in this neighbourhood, and a considerable export is anticipated.

**Supplies.**—Beef can be procured at Muara, but no bread or vegetables. Water can be obtained of good quality at a charge of about one dollar a ton.

**Tides.**—The tides in Muara harbour are influenced by a large diurnal inequality which varies during the lunation. The highest high tide of one day is succeeded by the lowest low tide (this is an invariable

Chart. 2,134  
[2,392].  
Var. 2° E.

rule), then follows a lesser high tide and a higher low tide. The higher low water takes place on an average about three hours after the lower high water.

The difference between the heights of this lesser high tide and higher low tide is frequently only a few inches, and occasionally disappears altogether, causing only one high and one low water in each day; about neaps the tides are very irregular.

It is high water, full and change, at 11h. 0m.; springs rise from  $4\frac{1}{2}$  to  $7\frac{1}{2}$  feet; neaps rise  $5\frac{1}{2}$  feet, and range 2 to 3 feet. The range of the tide depends upon the phase of the moon and on her declination. The greatest range (*i.e.*, best defined spring tide) occurs when the moon is full or new, at the same time that she attains her highest declination north and south.

At the spring tides occurring after the moon has attained north declination, the higher high tide succeeds the moon's inferior transit; whilst at those occurring after the moon has attained south declination, the higher tide follows the moon's superior transit.

When the sun has south declination, the higher tides about springs occur during the night, and when the sun has north declination probably during the day.

The tidal streams set with the direction of the coast at a speed of 2 knots at springs. The flood stream sets in a southerly direction, commencing about one hour after low water; and the ebb stream to the northward and eastward commencing about a quarter of an hour after high water.

Lat.  $4^{\circ} 59' N.$   
Long.  $115^{\circ} 54' E.$

**Muara bar**, the best and most frequented entrance to Muara harbour, is the channel through the flat connecting the south-west end of Muara island with Padukan island, and forming the north-west side of Bruni channel. It is distant about a quarter of a mile from Muara island, and has a depth of 13 feet at low water spring tides, but the part where this depth is to be found is very narrow, and the directions must be carefully attended to. It is available for vessels of 15 feet draught after half flood; if properly buoyed those of deeper draught could use it, as the water is always smooth and the bottom of soft mud. A vessel of 17 feet draught has crossed the bar.

**Beacons.**—The channel over the bar is supposed to be marked by three posts on the eastern or Muara side; the outer post formerly carried a board with *To Muara* painted on it, which was not there in August 1904.

**NOTE.**—The beacons are not to be depended upon. Those formerly situated respectively S.  $85^{\circ}$  W., distant  $2\frac{1}{10}$  miles; S.  $83^{\circ}$  W., distant  $2\frac{1}{2}$  miles; and N.  $86^{\circ}$  W., distant  $2\frac{2}{10}$  miles, from Sapo point tree, were not in existence in September 1904.

**Directions.**—From the anchorage abreast Sapo point steer along the south coast of Muara at the distance of about  $2\frac{1}{2}$  cables towards Muara bar. When Pisang hill is on with the sign post steer to pass midway between that post and the one to the westward, and when abreast them steer to pass close to the inner post on the eastern side. Then steer for Sarasap village on the coast, on a N.W. by W.  $\frac{1}{2}$  W. course, until within half a mile of it, then up the fairway to Muara harbour, where there is anchorage off Brooketon in 7 to 8 fathoms, mud.

**Anson channel**, leading to Muara harbour, northward of Muara island, is available for small vessels of less than 9 feet draught. It has only a depth of 7 feet, sand, in some parts at low water spring tides, and is marked by two beacons, for which see plan 2,134. Three-quarters flood is the best time to enter.

**BRUNI RIVER.—Approach to Inner Bar.—Islands and dangers.**—The coast, southward of Muara harbour, trends south-westward, 6 miles to the mouth of Bruni river. Below Pisang hill there is a deep bight, which affords an outlet for transporting coal, a seam having been found on the western slope of the hill, which can be easily approached by boats at high water. Between Muara and the mouth of the Bruni river there are three islands off the coast, viz.: Padukan, Ingaran, and Churmin; the former being abreast the bight mentioned, and the two latter on either side of Bruni bar.

**Padukan island**, half a mile in length, and a quarter of a mile in breadth, is densely wooded and slightly elevated in the middle, making the tops of the trees in that part 105 feet above high water.

**Oyster rocks.**—Between Padukan and the mangrove point to the south-west of it, is a shallow flat, which can be crossed by boats only at high water. A cluster of rocks is situated  $4\frac{1}{2}$  cables south-west of the island, and continues thence to the coast; the highest rocks showing 2 feet above high water.

**Ingaran island**, 6 cables in length and one cable in breadth, is densely wooded, the tops of the trees being 123 feet above the sea. Coal is visible here. Within Ingaran, there is a narrow strip of comparatively deep water which terminates one cable to the north of the island, and is therefore of no use as a means of evading Bruni inner bar.

**Beacon.**—Ingaran spit projects from the north coast of Ingaran island in an E.N.E. direction for 9 cables, is composed of sand and mud, and dries at low water spring tides. A beacon of poles is placed  $3\frac{1}{2}$  cables S.W. by W. from its extreme.

**Peaked rock** is the highest of a small group of rocks situated 150 yards south of Ingaran island; it is 2 feet high, and the only one which is not covered at high water.

Charts, 2,134  
[2,591]  
1,669 [2,589].  
Lat.  $4^{\circ} 59' N.$ .  
Long.  $115^{\circ} 34' E.$ .  
Var.  $2^{\circ} E.$ .

Charts, 2,134  
[2,592],  
1,969 [2,589].  
Var. 2° E.

**Churmin island** is  $2\frac{1}{2}$  cables in length by one cable in breadth, and densely wooded. At its south end there is a large clump of trees, the tops of which are 92 feet high; near the centre of the island there is a tree 89 feet high, and a useful mark for Bruni bar.

\*Lat.  $4^{\circ} 56' N.$   
Long.  $115^{\circ} 04' E.$

**Jaja ridge.**—Westward of Ingaran island the range of hills extending southward from Bruni bluff, attains a higher elevation and approaches the river, running parallel to the bank for some miles. This range, known as the Jaja ridge, is steep, densely wooded, and has some prominent peaks, on one of which stands a conspicuous bushy tree,\* 537 feet above high water, which attracts attention from the north-eastward and is one of the leading marks for vessels crossing the Outer and Bruni bars.

**Kindana hill.**—River point, on the east side of entrance to Bruni river is well marked by Kindana hill, which is densely wooded and has a conspicuous clump of trees on its summit, the top of which is 516 feet above high water. It is conspicuous from seaward, and may be recognised at a distance of 20 miles in clear weather.

**MOUNTS SAY AND HAMILTON**, two conspicuous peaks, 760 feet and 730 feet high respectively, are situated about 7 miles south-westward of Kindana hill. They are much alike in appearance, both being densely wooded, with sharp summits; and are conspicuous from the north-eastward in any position where they can be seen clear of Jaja ridge or the Kindana hill.

**Baru Baru islands** are two islands lying  $1\frac{1}{2}$  miles eastward of Kindana hill. They each have a somewhat conspicuous clump of trees, that on the northern island being 125 feet, and that on the southern being 121 feet high.

**Rambler banks** extend about  $6\frac{1}{2}$  miles north-eastward of River point and the Baru Baru islands, to within a third of a mile of Muara island; they are from  $2\frac{1}{2}$  miles to  $1\frac{1}{2}$  miles in breadth, tapering to the north-eastward, dry in places at low water, and have numerous fish weirs on them. The north and west sides of the banks form the south side of entrance to Bruni channel.

**Clearing mark.**—Pisang hill in line with Bowong point bearing W. by N.  $\frac{1}{2}$  N., leads northward of Rambler banks, in 17 feet; Bowong point might possibly be growing out, in which case, with the objects in line the depth would be less. Sapo point tree N.N.E.  $\frac{1}{2}$  E. leads eastward of the banks.

Lat.  $4^{\circ} 59' N.$   
Long.  $115^{\circ} 7' E.$

**BRUNI CHANNEL.—Navigable depth.**—The approach to Bruni channel is close southward of Muara island, between it and Rambler banks. Vessels drawing 18 feet can ascend the Bruni chunnel as far as

General chart, 2,109 [2,589].

Ingaran spit, about 9 miles below Bruni; and vessels up to 24 feet draught could proceed so far by buoying the channel and choosing the time of high water for moving. Kindana and Pisang hills and Sapo point will be good marks for laying the buoys. It is better, however, except in case of emergency, for all vessels drawing over 15 feet (the maximum safe draught for Bruni bar) to remain at Sapo point.

Brunei channel, from abreast Muara bar, is 4 miles in length, with a navigable width of about 2 cables, the shallowest part and also the narrowest being at its entrance, abreast Muara bar, where the distance between the 3-fathoms line on either side is, in one place, only  $1\frac{1}{2}$  cables, and the depth 19 feet. It is this part which presents the greatest difficulty to navigation, as the tidal streams often set across the course, and unless Churmin tree and mounts Say and Hamilton are clearly in view, no vessel should attempt to proceed.

**Directions from Sapo point to Bruni Inner bar.**—From abreast and 3 cables distant from Sapo point, the east extreme of Muara island, steer West for about 2 miles, parallel to the coast. Course must be altered to the south-westward in time, so that when Pisang hill is in line with the Sign post on Muara bar, bearing W. by N.  $\frac{7}{8}$  N., Churmin tree will be in line with mount Say bearing about S.W.  $\frac{1}{4}$  W. (see sketch C on plan 2,134); thence steer S.W. by W.  $\frac{1}{4}$  W. into Bruni channel, until Pisang hill bears N.W. by W.  $\frac{1}{4}$  W. From this latter position steer S.W.  $\frac{1}{2}$  W. up the channel until Churmin tree is in line with mount Hamilton, bearing S.W.  $\frac{1}{4}$  S., then keep these marks in line; see view B on plan.

**Anchorage.**—If not intending to cross Bruni inner bar, anchor on the leading mark last mentioned, or near it, in about 20 feet, mud, with Ingaran spit beacon bearing W. by S. In the exceptional case of vessels of more than moderate draught approaching the bar, it will be necessary to anchor on the leading mark further northward.

**BRUNI INNER BAR** is the chief obstacle in the approach to the town of Bruni, 9 miles above it. It extends from Ingaran spit to Churmin island, a distance of  $1\frac{1}{2}$  miles, and its chief features are the North bar bank, the South bar bank, and the Barrier. The Barrier is visible at low water spring tides, but the others never dry.

The Barrier is of ancient origin, dating back probably at least 300 years, to the time of the Chinese occupation. It is composed of loose boulders, and is crescent shaped, beginning at about a cable from the eastern shore of Ingaran island and terminating 6 cables southward in a spot marked by No. 5 beacon. A tide ripple usually indicates its position.

Off the end of the Barrier there is a remarkable hole of deep water, as much as 80 feet being found half a cable south of it.

There are two channels over the bar.

Lat.  $4^{\circ} 56' N.$   
Long.  $115^{\circ} 14' E.$

Charts, 2,134  
[2,592].  
1,669 [2,593].  
Var. 2° E.

**The North-western channel**, over Bruni inner bar, between North bar bank and Ingaran spit, although longer and more tortuous and with a foot less water than Simpson channel, is the one commonly used, and is beaconed. The shallow portion extends over a length of about 150 yards only. The least depth is  $7\frac{1}{2}$  feet over a mud bottom, at low-water springs, which gives about 12 feet at high water neaps, and about 15 feet at high water, ordinary springs. This channel is said to have silted up (1901).

**The beacons** which are intended to mark this channel are weak stacks of poles, difficult to make out at times, and liable to be knocked down; they are therefore not to be depended on. There should be six, not counting Ingaran spit beacon.

**Note.**—Several of these beacons were reported as missing by H.M.S. *Phœnix* in June 1903, and are not shown on the existing plan (1905), but the following directions are given under the assumption that the beacons will be replaced. The local fishermen are paid by the Sultan of Bruni for the upkeep of these beacons.

It is advisable to mark the shoal water on each side before crossing the bar.

**Directions.**—From the anchorage mentioned in Bruni channel, steer towards Ingaran spit beacon, until Peaked rock is in line with the conspicuous bushy tree on Jaja ridge, bearing S.W. by W., then steer on those marks, passing the spit beacon at the distance of a cable. When No. 1 beacon bears S. by W. steer for No. 2 beacon, passing half a cable westward of No. 1 and close eastward of No. 2 beacon (here the channel is but 60 yards wide). Then steer for Kindana hill in line with No. 6 beacon, which leads between the Barrier and the rock with 3 feet water situated half a cable eastward of the south end of the Barrier. Pass close eastward of No. 5 beacon.

When rounding No. 5 (the Barrier) beacon, the helm should be put over in good time as the turn is sharp. In most cases, a vessel would cross the bar near the top of the flood when she would have the tidal stream in her favour. Pass the north end of Churmin island at the distance of  $1\frac{1}{2}$  cables to avoid Churmin rock, with 8 feet water, lying 150 yards north-west of Churmin island. A tide ripple usually indicates the position of this rock.

Having passed Churmin rock the river is open and presents no known dangers beyond sandbanks, for avoiding which, as no survey has been made above River point since a sketch in 1845, the existing plan cannot be trusted. The bends of the river should be followed and the points given a wide berth as in most river navigation.

**Simpson channel**, the south-eastward channel over Bruni Inner bar, into Bruni river, lies between North bar bank and South bar bank; it is nearly straight, and has  $8\frac{1}{2}$  feet in it at low water, with mud bottom, but is only from 50 to 100 yards wide, and the shallow ground extends for

Lat.  $4^{\circ} 57' N.$   
Long.  $115^{\circ} 24' E.$

General chart, 2,109 [2,589].

7 cables ; it is unmarked. The landmarks, however, are good, and it is the safest channel to adopt, both when entering and leaving the river.

Charts, 2,134  
[2,592]  
1,669 [2,593].  
Var. 2° E.

At high water spring tides, when day tides are the highest (April to October), it is possible to force a steam vessel drawing 17 feet over the bar by Simpson channel, with her keel in the mud ; however, 15 feet should be considered the maximum safe draught at high water highest spring tides, 13½ feet at high water lowest spring tides, and 12 feet at high water neaps. Local trading steamers frequently cross with their keels in the mud.

This channel is said to be subject to rapid alteration. H.M.S. *Plover*, in June 1900, obtained 15 feet least water when crossing the bar, and the same depth was found by H.M.S. *Bramble* in October of that year upon carefully sounding it.

**Directions.**—The leading mark for Simpson channel, namely, Churmin tree in line with mount Hamilton S.W. ¼ S., is the same as for approaching it from Padukan island (*see* sketch on both plans). Above Ingaran spit beacon, the channel becomes narrow, and the leading mark must be closely kept. Pass about 10 yards eastward of No. 3 beacon, and haul to the southward in time to steer for Kindana hill, when in line with No. 6 beacon, to avoid the Barrier. Round No. 5 beacon closely as for the North-western channel ; give Churmin island a berth of 1½ cables to avoid Churmin rock, and thence haul south-westward along the western shore where the water is deeper.

One advantage of Simpson channel over the North-western, which is the more frequently used, is that vessels using it are nearly independent of beacons. The only one which need be regarded is No. 5 ; and if, at any time, this beacon were removed, a boat might be substituted for it at the end of the Barrier.

**On leaving** Bruni river, vessels should not alter course to the eastward to approach the end of the Barrier until the north end of Baru Baru islands is seen opening northward of Churmin island. Pass close southward of No. 5 beacon and reverse the directions for entering.

**Pilots.**—There are no licensed pilots for Bruni river, and it is difficult to obtain a competent person to act as pilot.

**Anchorage.**—No directions can be given for the best place for anchoring, but for the reason given in the remarks about the town it would be desirable to get as far from the houses as possible.

There is good anchorage off the Sultan's palace, in a depth of 7 fathoms, with sufficient swinging room for vessels 170 feet in length.

**BRUNI.**—The town, situated 9 miles within the bar, is probably the largest in the island of Borneo.

Lat. 4° 52' N.  
Long. 14° 55'

The Sultan of Bruni resides here ; also a British Resident, who has powers to control the general administration of the State of Bruni.

Charts, 2,134  
[2,592].  
1,669 [2,593].  
Var. 2° E.

The town is remarkable from being entirely built upon piles in the centre of a lake-like enlargement of the river, and the population in 1895 was about 15,000. The houses are mostly in a dilapidated condition, and the accumulation of the filth of centuries thrown from the houses into the shallow water, in which most of them stand, produces most unpleasant results at low water.

During the year 1903 there was an outbreak of an epidemic resembling cholera, which carried off one-third of the inhabitants of the town of Bruni.

**Supplies.**—Fresh water may be obtained from a spring near the base of the Kianghi, where the natives will be observed filling their bamboos.

The market of Bruni, carried on by numerous canoes, furnishes poultry, eggs, deer, fruit, vegetables, &c. Money, iron bars, coloured and plain cottons, are all of value in exchange.

Bullocks can be obtained through the Kadyans or Dyak race of this region, the Malays not being a pastoral or farming race.

**Trade.**—Imports from the United Kingdom amounted in value to 6,856*l.* and the exports to 296*l.* in the year 1895. Trade has fallen off of recent years and very little is done now.

About 20 vessels, exclusive of coasting craft, enter the port annually, and one dollar per ton registered is levied on them.

**Communication.**—There is communication frequently by small steam craft with Labúan. Telegrams are sent by steamer to Labúan, which is connected with Singapore, Hong Kong, Sandakan, &c.

Lat. 4° 59' N.  
Long. 115° 7' E.

**The approach to the Limbang river.**—Southward of Sapo point, Muara island, and separated from Bruni channel by Rambler banks, there is a straight navigable channel, with a depth of about 6 fathoms for some distance, which is the means of communication between several small rivers and the sea. The most important of these streams is the Limbang river, which is reported to have 11 to 12 feet on its bar at high water. The channel to it, within the limits of the *Rambler's survey*, is safe for vessels of 20 feet draught; but it is said by those who have explored it further to the southward, that it rapidly becomes shallower a short distance above the area surveyed; see plan 2,134. The source of the Limbang is about 150 miles inland.

**BRUNI BAY**, between Polompong point, entrance to Bruni river and Kalias point, is 21 miles wide, with depths of 14 to 20 fathoms. The Labúan group of islands lie in the entrance. Eastward of Sunda bank the 3-fathoms bank fronting the shore, extends about 1½ miles off as far eastward as Lawas or Benkulet river, beyond which it extends but a short distance. Padas bay, in the eastern corner, is shallow, and fronted by a bank to the distance of about 2 miles; thence to Kalias point it extends from one to 2½ miles off, apparently, but it has not been properly surveyed.

General chart, 2,109 [2,589].

The Trusan, Benkulet, Mangalong, Sipitong, Lukutan, Padas, Kalias, Chart. 1,844  
[2,590].  
Var. 2° E. and many other rivers discharge into Bruni bay.

The Padas is a fine river, navigable for a considerable distance by craft of light draught, and having on its banks many sago plantations which are a source of considerable wealth to the inhabitants of its district. Kalias river is described on page 171. The Trusan is about 150 miles in length, and rises near the Limbang source.

**Communication.**—From Weston\* in Padas bay there is a rail- \*Lat. 5° 12 $\frac{1}{4}$ ' N.  
Long. 115° 35 $\frac{1}{4}$ ' E. way to Beaufort, and thence to Jesselton in Gaya bay, the whole length being 110 miles; from Beaufort a branch line runs inland to Fort Birch.

A telegraph line has been constructed from Menambok, at the mouth of the Kalias river, the landing place of the submarine cable from Singapore, to Sandakan and Darvel bay. There is a separate line from Beaufort along the railway to Jesselton and thence to Kudat.

**LABÚAN ISLAND.—General remarks.**—Labúan island, situated about 5 miles off the west coast of Borneo, is about 10 miles in length by about 5 miles in maximum breadth, with an area of about 31 square miles. Some small islands lie off its south-west and south-east sides. The population is about 8,400. It was ceded to Great Britain by the Sultan of Borneo in 1846, being at that time uninhabited. The government is administered by the Governor of the Straits Settlements, who resides at Singapore, *see page 11*.

Labúan possesses a good harbour in Victoria, available for all classes of vessels.

**Aspect.**—The north end of Labúan is the highest part of the island, its summit topped by trees being elevated about 300 feet, and appearing when seen from the north as two peaks of equal height. It is surrounded by sandstone cliffs, and an extensive reef stretches off the northern point; a continuation of this belts the island, offering occasional breaks admitting boats. The southern portion of the island is marshy and intersected by streams. A large portion of the island is covered with thick jungle, consisting principally of trees from 100 to 120 feet high.

**Beacon.**—A tripod beacon, about 40 feet high, surmounted by a Lat. 5° 22 $\frac{1}{4}$ ' N.  
Long. 115° 13 $\frac{1}{4}$ ' E. barrel painted white, has been erected on the summit of one of the northern hills on the island at a distance of  $1\frac{6}{10}$  miles S. 71° W. from Raffles jetty head. From the northward the hill appears as the westernmost and shows as a slight cone; it may be easily recognised by the high dead trees surrounding it.

**Trade.**—Extensive coal measures exist in the north part of the island, worked by the North Central Borneo Company, from which about 50,000 tons of coal are exported annually. The mines, which employ about 1,500 workmen, are connected with the wharf at Victoria harbour by a railway, about 8 miles in length.

General chart, 2,109 [2,589].

Charts, 1,844  
[2,590].  
947 [2,591].  
Var. 2° E.

Trade also consists in the exchange of cloth, rice, crockery, ironware, &c., for the produce of Borneo and the neighbouring islands, consisting of gutta percha, india rubber, rattans, birds' nests, canes, wax, sago, &c. There are four sago manufactories in the island, and good timber is abundant. The value of the imports in 1902 amounted to \$1,948,742 and exports to \$1,198,945.

Vessels of the aggregate tonnage of 365,524 entered and cleared in 1902.

**Communication.**—Labúan is connected with Singapore and Hong Kong by submarine cable, and with Sandakan and Darvel bay by land lines across Borneo from Mempakol on the mainland.

Mail communication from England fortnightly *via* Brindisi, and by French packet to Singapore.

Three steamers run regularly (one about every 10 days) between Singapore and North Borneo ports touching at Labúan.

The Sarawak Government steamer runs once a fortnight between Kuching and Labúan.

**Supplies.**—Fresh beef is obtainable at Labúan, also bread, vegetables, fruit and fish. Water is brought down in pipes to the piers in Victoria harbour; the supply is ample, but the quality only fair.

**Coaling piers.**—Bazaar wharf at the town is 382 feet in length, with a depth of 18 to 24 feet alongside at low water. There are two coal sheds near it capable of holding about 1,400 tons each, but the amount kept in stock varies. Five hundred tons can easily be put on board in 24 hours.

At about 300 yards south-eastward of the wharf is a coaling pier, alongside of which vessels of 25 to 27 feet draught can coal at low water; a railway connects the wharf and pier with the mines. A third pier is situated about 200 yards further to the eastward, but it is much decayed and not used. There are mooring buoys off the piers for securing to.

The average output of coal is about 4,500 tons per month. During July and August, 1897, no less than 17 seagoing vessels coaled at Labúan, taking upwards of 8,000 tons.

No coal is now sent from the mines to Raffles point anchorage.

Lat. 5° 17' N.  
Long. 115° 16' E.

**Rifle range.**—There is an excellent rifle range here, situated at Collier point, where firing can be carried out by the seamen of H.M. Ships under service requirements.

**Standard time.**—The standard time kept at Labúan is that of the meridian of long. 120° E., or 8 hours fast on mean time at Greenwich.

**Climate.**—Remittent and intermittent fevers occasionally prevail, but are of a mild type. The European ward in the civil hospital, at Victoria, has accommodation for two or three persons, and sailors will be received

there if necessary. The average mean temperature for the year is  $81.7^{\circ}$ , Charts, 1,844  
[2,540].  
947 [2,591].  
Var.  $2^{\circ}$  E. the maximum, in September, being  $97^{\circ}$ , and the minimum in the same month  $71^{\circ}$ . January is about the coolest month, the maximum being  $87^{\circ}$  and the minimum  $72^{\circ}$ . The maximum daily range is  $16^{\circ}$ , and the mean  $10.7^{\circ}$ . Rain falls in every month of the year. The annual rainfall is 136 inches; about 16 inches is the fall per month from about August to October, decreasing to 5 and 6 inches in February and March.

**Winds and Weather.**—The weather at Labúan is generally very fine; the land and sea breezes are seldom interrupted. Rain generally comes off the coast of Borneo in squalls, which most frequently occur between 8 p.m. and midnight, and blow heavily, especially in June and July. In the south-west monsoon the land breeze, which usually commences with these squalls, lasts until 7 or 8 a.m., and is a steady fresh breeze, whilst in the north-east monsoon it is light and variable, but if blowing hard in the China sea the land wind is not felt at Labúan.

The sea-breeze in the south-west monsoon usually commences at noon, and lasts until 4 or 5 p.m. seldom exceeding a force of 4; but in the north-east monsoon it commences earlier, and lasts until 7 or 8 p.m., hanging well to the northward, and blowing fresh.

**VICTORIA HARBOUR**, on the south-east side of Labúan, is Lat.  $5^{\circ} 18' N.$   
Long.  $115^{\circ} 15' E.$  well sheltered in both monsoons. It has general depths of 6 to 7 fathoms over a bottom of stiff mud, decreasing gradually as the head of the harbour is approached.

Vessels should moor with open hawse to the S.E., as strong gusts from south to east occur, particularly at night. The atmosphere here is oppressive, and unless compelled to remain it is preferable to anchor southward of Pappan island, where the full strength of land and sea breezes will be experienced.

**Limits of the port.**—The port of Victoria is bounded on the East by a line drawn from the Columbine shoal buoy to the north-west point of Pappan island; South, by a line from Pappan island to the north point of Enoe island, thence to Hamilton point by a straight line running through the centre of Button islet; and on the West and North by the shore line to Ramsay point and thence to the Columbine shoal buoy.

**Prohibited anchorage.**—On account of the telegraph cables no vessel is allowed to anchor within an area enclosed by the following lines:—Ramsay point beacon to Enoe beacon, thence to south-west point of Pappan island, thence to Ramsay point beacon.

**LIGHTS.**—On the west side of Pappan island is exhibited from a pyramidal wooden structure, painted white, a *fixed white* light, said to be visible in clear weather from a distance of about 10 miles, when bearing from N.  $55^{\circ}$  W., through north and east, to S.  $35^{\circ}$  W. In December 1903, H.M.S. *Thetis* found this light very indistinct when only 2 miles from it.

Charts, 1,844  
[2,590].  
947 [2,591].  
Var.  $2^{\circ}$  E.  
Lat.  $5^{\circ} 16' N.$   
Long.  $115^{\circ} 15' E.$

A *fixed green* light, elevated 30 feet above high water, is exhibited from the middle coaling pier in Victoria harbour, visible at the distance of 5 miles, but it is not to be depended on.

**Tides.**—It is high water, full and change, in Victoria harbour at 9h. 45m.; springs rise 6 feet, neaps  $4\frac{1}{2}$  feet. When the sun has north declination the higher tides about springs occur during the day, and when the sun has south declination, during the night. At the equinoxes the rise of the tides is equal.

The direction and strength of the tidal streams are influenced by prevailing winds outside occasionally sending in a sudden swell.

**Shoals.—Buoyage.**—The buoys are not to be depended on.

The shores of the harbour are bordered with sand banks, which dry at low water, and are steep-to. On the west side they extend off nearly three cables in places, and are interspersed with patches of rocks and stones. On the north side the bank does not extend more than a cable from the shore.

**Ramsay point shoals.**—From Ramsay point, on the north side of the harbour, the shallow water extends in an E.S.E. direction for 7 cables, whence it turns north-eastward and northward. The south edge of this bank is marked by Inner beacon, with top-mark, erected in 12 feet water, with the white post on Ramsay point bearing W. by N., distant half a mile. At  $5\frac{1}{4}$  cables E. by N.  $\frac{1}{2}$  N. from Inner beacon and about one-third of a cable within the 5-fathoms edge of the bank, lies Columbine shoal buoy, chequered black and white, from which Collier head bears N.  $\frac{1}{8}$  W. distant  $9\frac{1}{2}$  cables. The shoal ground off Collier head is reported (1898) to be extending out eastward. Between Inner beacon and Ramsay point there is a coral patch of 6 feet and another of 4 feet, detached from the edge of the bank, but within the 5-fathoms line; both patches are steep-to on the south side. Westward of Ramsay point the edge of the bank is marked by two beacons.

**Harbour shoal,** lying in the fairway of the harbour, is a coral patch, half a cable in extent, with 9 feet water. A white buoy is placed on its centre, with the white post on Ramsay point bearing N. by E.  $\frac{1}{2}$  E., distant  $6\frac{1}{2}$  cables. Vessels may pass on either side of this shoal.

**Enoe island and Beacon.**—The shoal surrounding Enoe island, situated on the south side of entrance to Victoria harbour, consisting of sand with occasional patches of rocks and stones, extends 7 cables to the northward, 9 cables to the westward,  $3\frac{1}{2}$  cables to the southward, and 3 cables to the eastward of the island, and is steep-to. A beacon, surmounted by a triangle, is placed on its north-east extreme in 4 fathoms water, with the summit of Enoe bearing S.W.  $\frac{3}{4}$  S., distant  $6\frac{3}{4}$  cables.

Enoe spit lies S.W. by W.  $\frac{1}{2}$  W. distant  $1\frac{1}{3}$  miles from the island. The bay in the south side of Labúan is filled by a reef which extends  $1\frac{1}{2}$  miles off shore.

**Outer shoal**, in the southern approach to the harbour, between Pappan and Enoe islands is of coral, one cable in extent, with 3 feet least water near its eastern edge. A black buoy is moored on the shoal, which in 1899 was reported to be situated near the middle of it; vessels should give the buoy a good berth in passing. The passage between Outer shoal and Pappan island shoal is 6 cables wide, and has depths of 12 to 25 fathoms; the passage between it and Enoe beacon is 4 cables wide and has 9 to 11 fathoms.

Charts, 1,844  
[2,590].  
Var. 147 [2,591].  
Lat. 5° 14' N.  
Long. 115° 13' E.

**Pappan island**, flat, and covered with trees, the tops of which are 124 feet above high water, is surrounded by a shoal which extends one cable from the north, 2 cables from the west, and 3 cables from the south side; to the eastward it is separated by a small passage, half a cable wide, from the reefs extending from Daat island and the main coast of Borneo. See Light, page 169.

**Trident shoal**, lying S.S.W.  $\frac{1}{4}$  W., nearly a mile from Enoe island, is composed of coral, 2 cables in length and half a cable in breadth, with a least depth of 6 feet. The north extreme of Daat island touching the south end of Pappan leads southward, and the white post on Ramsay point open east of Enoe leads eastward of Trident shoal.

Lat. 5° 14' N.  
Long. 115° 13' E.

**Kalias river** lies with its entrance eastward of Daat island, at the north extreme of Bruni bay, and is approached over the flats surrounding that island. H.M.S. *Algerine*, September 1870, of 8 feet draught, steamed about 16 miles up the river to Kalias village.

Lat. 5° 17 $\frac{1}{2}$ ' N.  
Long. 115° 21 $\frac{1}{2}$ ' E.

**Mempakol** is situated between Kalias point and the mouth of Kalias river, from whence there is a land telegraph cable to Sandakan. There are jetties fronting the settlement.

**Earthquake**.—In September 1897 an earthquake threw up an island 200 yards in length, 150 yards in breadth, and 60 feet high, between Mempakol, Kalias point, and Lubedan islet, off Sakat point, at about 150 yards from the shore.

**ISLANDS and Dangers in the Southern approach.**  
**Barat bank**, about  $1\frac{1}{2}$  miles in length and a mile in breadth, has depths of 2 to  $2\frac{1}{2}$  fathoms over it and is steep-to on its north and west sides; a patch of  $2\frac{1}{2}$  fathoms lies  $1\frac{1}{2}$  miles south-west of the east extreme with which it is connected by a ridge with depths of less than 5 fathoms. The south end of this patch, also steep-to, lies with Rusukan Besar bearing N.E.  $\frac{3}{4}$  E., distant  $3\frac{2}{3}$  miles.

At one mile from the above  $2\frac{1}{2}$ -fathoms patch in the direction of Pelong rocks there is a depth of 7 fathoms, between which and Abana rock lies a deep channel  $1\frac{1}{2}$  miles in width.

**Rusukan islands**.—Rusukan Besar, one-third of a mile in extent, is the outer island off Kiamsan point, the south-west point of Labúan, from

Lat. 5° 11' N.  
Long. 115° 8' E.

Charts, 1,844  
[2,590].  
2,109 [2,589].  
Var. 3° E.

which it is distant 4 miles in a S. by W. direction. A rock which breaks at times lies 6 cables S.S.W. of it, between which and the island the ground is foul and there are several patches which dry. The extreme of the shallow water extending from the island lies about 3 cables south-east of the rock. A patch of  $2\frac{1}{2}$  fathoms lies one mile E. by S.  $\frac{1}{2}$  S. of the island. Rusukan Kechil lies about a mile N.N.E. of the larger island. Both are covered with trees and surrounded by reefs, dry in places, and extending nearly to that surrounding Kuraman island.

**Kuraman island**, covered with trees, lies between the Rusukan islands and Kiamsan point, and is 2 miles in length north-west and south-east, by about half a mile in breadth. A sunken reef, half a mile in extent, lies  $1\frac{1}{4}$  miles S.S.W. of its south point with foul ground between. The reef surrounding the island extends three-quarters of a mile south-east, half a mile north, and about a third of a mile east of the coast of the island.

Lat.  $5^{\circ} 15' N.$   
Long.  $115^{\circ} 9' E.$

**Kiamsan point** has a reef, dry in places, extending nearly a mile S.S.W. of it, at which distance there are rocks nearly awash.

**Caution.**—The **channel** between Kiamsan point and Kuraman between the 5-fathoms contours is reduced to a width of 6 cables, with irregular depths of 6 to 20 fathoms. Undaunted rock, a small coral head about 20 yards in extent with a least depth of 2 fathoms over it, lies in the centre of the fairway with the north-western extremity of Kuraman island bearing S.  $71^{\circ}$  W., distant  $1\frac{3}{4}$  miles, and the south-east extreme of the same island S.  $8^{\circ}$  E. Vessels without local knowledge are recommended not to use this channel until it has been properly surveyed.

**Directions for South channel.**—The shoals, more in the offing than those above mentioned, have been described in pages 152, 153. Bearings of Pelong rocks, Pisang hill, and Rusukan Besar, &c., will assist in keeping a vessel in the fairway between Pelong rocks and Barat bank. Being about 4 miles southward of Rusukan Besar, having passed on either side of Abana rock (*see* page 153), or proceeding also from Bruni river to Victoria harbour, steer for Pappan island when bearing N.N.E., observing that Daat island just open eastward of Pappan, leads eastward of Trident shoal. When about a mile from Pappan steer midway between it and Outer shoal buoy; thence northward of Harbour shoal buoy into the harbour.

Vessels wishing to sail in or out of Victoria harbour should always take advantage of the land and sea breezes, instead of attempting to work in. Arriving in the afternoon or night, it is better to anchor in a depth of 10 or 11 fathoms, about half a mile south of Outer shoal, weighing at daylight the next morning, and running in with the land breeze; and in leaving the harbour wait for the sea breeze between noon and 1 p.m., which carries a vessel with a fair wind past all danger.

**NORTH CHANNEL** has depths of 5 to 9 fathoms between the 5-fathoms contours on either side, with a breadth of three-quarters of a

mile. There is not less water than 5 fathoms known anywhere in the fairway.

Charts, 947  
[2,591].  
1,844 [2,590].  
2,109 [2,589].  
Var. 2° E.

\*Lat. 5° 24' N.  
Long. 115° 15' E.

**Dangers in.**—From Bethune head,\* the north extreme of Labúan island, foul ground extends  $2\frac{1}{2}$  miles in a N.E. by N. direction, at which distance there are patches of 4 fathoms. At half a mile within is a rock which breaks.

At about 3 miles W. by N. of Bethune head is a bank with  $2\frac{1}{4}$  fathoms, and another with  $3\frac{1}{2}$  fathoms a mile south-west of it. At 4 miles N.W.  $\frac{3}{4}$  N. are patches of 4 fathoms coral, with another patch of 6 fathoms about three miles westward of them. At 6 miles N.E. of the head is a patch of 3 fathoms near the fairway, with other dangers eastward of it. All these dangers are steep-to, and it is quite possible others may exist for which a careful look-out should be kept.

Within Bethune head the shore southward to Collier head is fronted by shallow banks to the distance of one to  $1\frac{1}{2}$  miles in places.

Sakat point on the east side of the entrance is fronted by dangers to the distance of a mile, there being a sunken rock at nearly that distance. Close to the point is Lubedan, a small clifffy islet, covered with trees, the tops of which are 50 feet high. The shore southward is fronted by a bank to a much greater distance, its outer edge being  $2\frac{1}{2}$  miles west and 3 miles north-west of Kalias point.

The continuation of the bank fronts Daat island to the distance of three-quarters of a mile, and extends nearly to Pappan island; there are rocks above water, and others that dry at low water scattered about on this portion.

**Directions.**—These directions are written from the plan. To enter by North channel, bearings of the extremes of Labúan, &c., will enable the position of the vessel to be fixed. Sakat point, or Lubedan islet off it, on a S.E.  $\frac{1}{2}$  E. bearing, will lead about midway between the dangers off Bethune head and the 3-fathoms patch. When 3 miles from Lubedan, haul down for the summit of Pappan island, bearing S. by W.  $\frac{1}{4}$  W., if it can be made out, until about  $3\frac{1}{2}$  miles from Collier head; then steer S.  $\frac{1}{4}$  W. until Collier head bears W.N.W., when Burong island will be open of Hamilton point (a close mark for the flat north-east of Inner beacon). Then steer with the east side of Rusukan Besar touching the west side of Enoe island, bearing S.W. by W., until abreast Inner beacon, whence haul into the harbour northward of Harbour shoal.

**Leaving by North channel.**—Vessels of deep draught when clear of the dangers off Bethune head,\* should bring the western end of the hills of Labúan to bear South, astern, which will lead westward of Gordon patches; thence pass between Fury rocks, awash at low water, and Saracen bank into the open sea, whence course should be shaped north-eastward for Paláwan passage. See Caution and the shoals referred to on the following pages.

\*Lat. 5° 24' N.  
Long. 115° 15' E.

Charts, 1,844  
[2,500].  
2,109 [2,589].  
Var.  $2^{\circ}$  E.

Vessels of about 12 feet draught may, in smooth water, take the passage within and through the shoals lying off the Bornean shore, but passing outside the group of Pine point shoals. The approach to many of the shoals will be guarded by the lead, and the heave of the sea over shallow patches and in some cases broken water will point out many of the dangers. A good look-out aloft should be kept as with the sun abeam the greenish hue of the shoals is visible. Jahat rock, which dries 2 feet, and the shallow head on Pine point shoals will probably be easily made out.

Vessels may also take a middle route, between Gordon patches and Fury rock, thence northward of Winchester and Nosong shoals, and southward of Tega islands, thence north-eastward within the Mantanani islands to the north extreme of Borneo, but constant care will be necessary.

#### COAST AND DANGERS NORTHWARD OF LABUAN.

**CAUTION.**—A glance at the chart will show that the whole of that part of the China sea extending from the Vernon bank north-westward of Labúan, in a line passing over the Saracen bank and Mangalum island to the Furious shoals, should, until closely surveyed, be navigated with the greatest possible caution. Vessels proceeding to China by the Paláwan passage should not venture amongst the shoals near Labúan and Mangalum island, but keep to the northward of them, and closer to the track recommended on the chart.

\*Lat.  $5^{\circ} 23' N.$   
Long.  $115^{\circ} 21' E.$

**COAST, Dangers off.**—From Sakat point,\* abreast Labúan, the coast trends north-eastward to Nosong point the west extreme of Kimánis bay, fronted by a bank varying from half to one mile off shore, except about midway, where the Pine point shoals, which are steep-to, extend upwards of 4 miles off shore; a sunken rock on the shoals, covered by one foot water, lies N.W.  $\frac{1}{2}$  W.,  $3\frac{1}{2}$  miles from the point, with a depth of 15 feet for nearly half a mile outside it. A coral patch having 10 feet on it at low water lies  $4\frac{1}{4}$  miles N.N.W. from Pine point, from which mount Nosong bears E.N.E., and the beacon on Labúan S.W.  $\frac{1}{3}$  W.; this is the outermost of the Pine shoals.

Within Pine point is a long table land, and a few miles to the south-westward near the coast is a range 450 feet high. A ridge of hills, 5 miles in length, terminates in mount Nosong 350 feet in height.

Lat.  $5^{\circ} 30' N.$   
Long.  $115^{\circ} 21' E.$

**Iris shoal**, with a least depth of 3 fathoms, is about one-third of a mile in extent, and lies with Labúan island beacon bearing S.W.  $\frac{1}{2}$  S., and Lubedan summit S.  $\frac{1}{2}$  E., distant  $7\frac{1}{2}$  miles; there are depths of 10 to 13 fathoms close around the shoal. There are several banks of  $2\frac{3}{4}$  and  $3\frac{1}{2}$  fathoms, with patches of 2 and  $1\frac{1}{2}$  fathoms between Iris shoal and the shore.

**Jahat shoals** are four shoals with deep water between and around them, extending over a distance of nearly 3 miles, with depths of  $1\frac{1}{2}$  to

4 fathoms over the shallow heads; one on the centre patch, Jahat rock, Charts, 2,109  
[2,589]  
dries 2 feet at low water, and is charted with the summit of the hill 2,111 [2,594].  
Var. 2° E.  
450 feet high, bearing S.E.  $\frac{5}{8}$  S., distant  $9\frac{1}{4}$  miles. Patches of 4 fathoms lie N.W., and North about  $1\frac{1}{4}$  miles from this rock.

Three shoals, close together, and extending  $1\frac{1}{2}$  miles in an E. by N. and W. by S. direction, and 7 cables broad, are situated about  $3\frac{1}{2}$  miles W.N.W. from the Jahat shoals; the least water obtained,  $4\frac{1}{2}$  fathoms, is on the western shoal.

**Gordon patches** are several isolated patches covering a space of about 3 miles in diameter with depths varying from 4 to 7 and 10 fathoms. There is one small spot with a depth of 65 fathoms from which gas bubbles frequently arise. From the 4-fathoms head the north extreme of Labúan bears S.  $\frac{1}{2}$  E., distant  $11\frac{1}{2}$  miles; there are depths of 16 to 30 fathoms around them. A small patch with  $4\frac{1}{2}$  fathoms over it lies  $3\frac{1}{2}$  miles W. by S.  $\frac{1}{2}$  S. from Gordon patches.

**Winchester shoal** has a depth of  $1\frac{1}{4}$  fathoms with from 5 to 10 fathoms at a short distance, and lies N. by W.  $\frac{1}{4}$  W., distant 7 miles, from the patch which dries on Jahat shoals. Between it and Gordon patches are banks with 8 to 10 fathoms.

**Samarang bank** within a depth of 10 fathoms is about 6 miles in length by  $3\frac{1}{2}$  miles in breadth, and steep-to beyond the 10-fathoms line; it has general depths of 4 to 6 fathoms, and the least depth found when it was examined was  $3\frac{1}{2}$  fathoms. A depth of  $2\frac{1}{2}$  fathoms has since been found on the western part of the bank, and at the same time the sea was observed to break over the bank during smooth water. The natives of Labúan state that there are many rocks on the bank which break at low water. Its western extreme lies with the north end of Labúan bearing Lat. 5° 34' N.  
Long. 114° 51' E. about E.S.E., distant 26 miles.

**Vernon bank** is about 12 miles in length in a north-east and opposite direction by about 7 miles in breadth, within the 10-fathoms line, and steep-to, with general depths of 4 to 8 fathoms over a coral bottom. Near its centre are the Fury rocks, about 3 miles in extent, consisting of coral patches with from 2 to 3 fathoms, with some pinnacle rocks awash at low water. In fine weather there is seldom much break of the sea over them, and at high water possibly none at all. From the centre of these rocks, in the position given, the highest part of Labúan is just visible. Near the north-east extreme of the bank, about 6 miles from Fury rocks, is a patch of  $2\frac{1}{2}$  fathoms. Vessels should give Vernon bank a wide berth, as the currents in its vicinity are uncertain.

Lat. 5° 44' N.  
Long. 115° 21' E.

**Growler bank**, about 8 miles north-east from the patch which dries on Jahat shoals, is about half a cable in extent, with  $5\frac{1}{4}$  fathoms water, and lies with Nosong point E. by S.  $\frac{1}{4}$  S. distant  $7\frac{1}{4}$  miles.

Charts, 2,100  
[2,589].  
2,111 [2,594].  
Var. 2° E.

\*Lat. 5° 42' N.  
Long. 115° 29' E.

A shoal about one mile in length lies one mile westward of Growler bank, with depths of  $4\frac{1}{2}$  to 5 fathoms, coral bottom; from its least depth, on the southern end, mount Nosong bears S.  $72^{\circ}$  E., distant  $8\frac{7}{10}$  miles.

**Nosong shoal** lies from 9 to  $10\frac{1}{2}$  miles West from the south point of Tega island; it is composed of coral with several rocky heads, which dry a few feet at low water, on the south-west side.\* From these rocks, on which the sea invariably breaks, the shoal extends one mile north-eastward and about half a mile south-eastward. A tongue of the shoal with less than 5 fathoms extends 2 miles or more eastward of the dry part and about  $1\frac{1}{2}$  miles southward, with outlying patches of 4 to 5 fathoms.

The north Tega or Burong island, which is high and conspicuous, in line with the north side of Tega island leads southward; Turtle island, open northward of Tega, leads northward; and Tangut rock shut in with the point eastward of mount Nosong, leads eastward of Nosong shoal.

**Nosong patch** of 3 fathoms, lies  $1\frac{3}{4}$  miles N.W. by W.  $\frac{4}{4}$  W. of Nosong islet, which lies close to Nosong point.

Another patch with a depth of  $3\frac{1}{2}$  fathoms over it is situated 6 cables farther to the westward.

Lat. 5° 38' N.  
Long. 115° 35' E.

**Nosong point**, the west extreme of Kimánis bay, is fronted by a bank with less than 3 fathoms to the distance of  $1\frac{1}{2}$  miles in a north-east direction. About midway is Tangut rock, 15 feet high, with rocks awash half a mile E.N.E. of it, and a patch of  $2\frac{1}{2}$  fathoms N.E. by N., distant  $1\frac{1}{2}$  miles from the rock.

**TEGA CHANNEL** is the passage between Nosong point and Tega island, and is that mainly used by vessels passing up and down the coast. The 5-fathoms line extends out  $2\frac{1}{2}$  miles from Nosong point, but between it and the shoal ground off Tega the channel is 3 miles wide.

In the centre of this channel is Dunlop shoal, of small extent, with 19 feet water over it, and 10 to 12 fathoms around. It lies with Tangut rock bearing S.  $26^{\circ}$  W. distant  $3\frac{6}{10}$  miles, and the south-east extreme of Tega island N.  $75^{\circ}$  E. It may be passed on either side.

**Tides.**—It is high water, full and change, at Tega at 11h. 10m., springs rise 6 feet. The tidal streams off the south-east end of Tega island are very irregular, and appear to be influenced by currents in the offing set up by temporary or constant prevailing winds. In December they more often set between E.N.E. and S.E. and attain a strength of over three-quarters of a knot per hour, the ebb setting to the E.N.E.; occasionally with the flood tide the stream flowed to the S.W.

Lat. 5° 44' N.  
Long. 115° 38' E.

**TEGA ISLAND**,  $2\frac{1}{4}$  miles in length, N.W. by W. and S.E. by E. is situated 6 miles north-north-eastward of Nosong point. Turtle and Burong islands lie to the northward of it, and belong to the Tega group. The three islands lie on a coral bank about 5 miles in extent, running to the north-eastward from Tega island. There is good anchorage and shelter in the N.E. monsoon in a depth of 8 fathoms, on the south side of Tega

island, with the centre summit bearing N.N.E. and the north-west point of the island N.W.

Chart, 2,111  
[2,694].  
Var. 2° E.

Shoal water, with a depth of  $1\frac{1}{2}$  fathoms near its outer end, extends from the south-east point of Tega island for half a mile ; it is steep-to outside.

The timber on the islands is casuarina, which is easily cut, when green, and forms excellent fuel ; in its dry state it is as hard as lignum vitæ. The beach is adapted for the seine.

There is a depth of 3 fathoms between Tega and Turtle islands, but the passage is narrow and not recommended.

Burong island is high with trees on it, and affords good anchorage off its south-east side in 9 fathoms, at about half a mile distant.

**Deluar reefs**, on which the sea breaks, lie between 5 and  $8\frac{1}{2}$  miles N.  $\frac{3}{4}$  E. from Burong island, and are steep-to with rocks above water near the centre from which the east extremes of Burong, Turtle, and Tega islands are in line bearing S.  $\frac{3}{4}$  W., the first being distant  $6\frac{3}{4}$  miles. A patch of 3 fathoms lies at the north-east extremity of the reef, steep-to on its north and east sides.

Lat. 5° 52' N.  
Long. 115° 41' E.

**KIMANIS BAY**, lying between Nosong point and Papar point, is nearly 19 miles wide and apparently free from danger, with depths of 7 to 16 fathoms.

**Kapala river** in the western corner of the bay has 4 feet on its bar ; it is fronted by a bank with less than 3 fathoms to the distance of 2 miles. One advantage this river seems to possess over any other in Kimánis bay is, the freedom from rollers, and complete protection for boats from all winds westward of North. The water of the river is stated to be fresh near its source. The settlement of Sitompok is about 2 miles above the mouth.

At the head of the bay are the small rivers Lama, Membakut, and the Bangawan, the former with 5 feet on its bar at high water. The settlement of Bangawan is about 2 miles up the river of the same name.

**Kimánis river**, in the eastern part of Kimánis bay, has a bank extending nearly a mile south-westward of its north point ; its bar is dry at low water. Craft of 5 to 6 feet draught may possibly enter at high water by the southern channel, which will not be discovered until rounding the tail of the rollers over the bank mentioned, which overlapping, at first sight apparently forbid any attempt to enter. During the rainy season there is a considerable outpour from the river, and the tidal stream could never ascend it for any distance, as the bar is dry at low water and the rise but small. The settlement of Kimánis is about 2 miles up.

Lat. 5° 36' N.  
Long. 115° 52' E.

**Trade.**—There was formerly a fair trade in this river with the

General chart, 2,680b [2,679].

E 32369.

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Chart, 2,111  
[2,594].  
Var. 2° E.

interior, and this has probably increased. Seed-pears, camphor, beeswax, pepper, &c. are exported.

**Supplies.**—Bullocks, goats, ducks, fowls, vegetables, and fruit, are obtainable. Watering here is inconvenient, as the natives must be relied on to fill and bring the casks to the boats.

**Railway.**—The railway from Weston to Jesselton crosses the Kimánis river about a mile within its entrance.

**The Benoni** is situated  $2\frac{1}{2}$  miles northward of the Kimánis; during the freshets it floods the neighbouring land; on the south side near its mouth there was formerly a canal or long pond of fresh water some 5 feet deep. The river may be entered by small boats at high water under favourable circumstances.

**The Minani**, about 3 miles northward of the Benoni, is barred, but, like the latter, can be entered by boats at high water. It trends northerly about one mile parallel to the beach and in the direction of the high hummock or peak, named Kinindukan, within Dukan point. Dead Tree mount, some 3 miles inland, is about 400 feet high.

**COAST.**—North-eastward of Dukan point, the shallow bank fronting the coast recommences, in some places extending  $1\frac{1}{2}$  miles off, but it is easily avoided by due attention to the lead. The inland ranges attain a height of 1,500 to 2,000 feet. The rivers are insignificant, and do not offer any inducement for trade or other purposes until reaching Gaya bay.

Lat. 5° 45' N.  
Long. 115° 54' E.

**Papar river**, about 3 miles northward of the Minani, discharges close eastward of Papar point; it has about 6 to 7 feet on the bar at low water, and is navigable by boats for a distance of 20 or 30 miles. The entrance, which is a little more than a cable broad, is difficult to recognise from seaward; it is fronted by a shallow bank to the distance of a mile.

**Pulo Laiang or Lyang**, situated 2 miles north-west from Papar point, is high and steep-to.

Lat. 5° 50' N.  
Long. 115° 58' E.

**Dináwan island**, nearly half a mile in length and 240 feet in height, is situated 7 miles north-eastward of Laiang and 2 miles off shore; a reef, dry in places, extends about 4 cables south of it, on which stands an island 185 feet high; a detached reef lies beyond. On the eastern side of the island, distant about 2 cables, is Everett reef 3 cables in length, which dries in places: at  $1\frac{1}{2}$  cables southward of it is a reef dry at low-water springs, with Flint pass between. The space between Everett reef and the island reef affords anchorage for small craft in about 6 fathoms.\* The bank fronting the mainland extends  $1\frac{1}{2}$  miles off, to within a third of a mile of Dináwan. On this flat is Sugara island with several sunken rocks near it.

**Dumpil** rock, with 6 feet water and steep-to to seaward, is situated at the extreme of the shallow water which projects  $1\frac{1}{3}$  miles from the point

\*Plan on chart.

General chart, 2,660b [2,679].

of the same name. Patatan river discharges southward of the point. Charts, 2,111 [2,594], 955 [2,595]. Var. 2° E. Dumpil village lies in the bay southward of Dumpil point, southward of which is Panudan islet.

**Lutut point**, about  $3\frac{1}{2}$  miles northward of Dumpil point, is fringed by shoal ground to the distance of one mile, with rocky patches that dry at low water. There are also several detached shoals within Sulúg and Manúkan, and the channel should not be attempted.

**Port Dalrymple** is not now used as a port. The shelter in it is poor in strong winds. The flat ground hereabouts is part of the Tanjung Aru estate, and has in parts been planted with cocoanuts.

**Manúkan**, Mamuli, and Sulúg are three small islands, densely wooded, lying between 2 and 3 miles south of Gaya island, and the same distance westward of Lutut point, between which there is safe anchorage in about 14 fathoms, mud, with the wind from the northward.

**Siguiata** or Loney islet nearly joins the south-west point of Gaya island. Lat. 6° 0' N. Long. 115° 59' E.

**GAYA ISLAND**,  $4\frac{1}{2}$  miles in length, W.N.W. and E.S.E. by  $1\frac{1}{2}$  miles in breadth, is 950 feet high, and densely wooded; it is almost connected with the shore, distant one mile, by a reef about one mile wide which is almost dry at exceptionally low tides, except for the narrow South channel which runs through it.

Snake rock, which is 3 feet above high water, stands about the centre of this reef.

**Creighton patch**, of small extent, on which the least water found was 5 fathoms, lies  $8\frac{1}{4}$  cables N.  $61^{\circ}$  E. from Plompong islet and N.  $18^{\circ}$  W. from Lipat point.

**Normanhurst reef** of small extent, awash at low water, lies in the approach to Gaya harbour, situated with the outer Plompong islet bearing N.W. by W., distant 9 cables, and Snake rock S.W. It is marked by two red beacons each surmounted by a basket over a cross.

**Grieve reef**, with 6 feet water and 8 fathoms around, lies  $4\frac{1}{2}$  cables S.W. by W.  $\frac{1}{4}$  W. from Normanhurst reef and off Gaya harbour, with Plompong island bearing N.  $25^{\circ}$  W., distant  $8\frac{1}{4}$  cables. It is marked by a white beacon, not to be depended on.

Gueritz shoal, a very small patch of 14 feet, marked by a red beacon, lies S.  $80^{\circ}$  E.  $2\frac{1}{2}$  cables from Grieve reef.

**GAYA HARBOUR**, at the east end of Gaya island, affords good anchorage in a depth of 10 fathoms. The Plompong islets stand on the northern reefs which break during the north-east monsoon; the larger islet is 46 feet high and conspicuous. The eastern and southern points of the reef are marked by beacons.

Charts. 2,111  
[2,594],  
955 [2,595],  
Var. 2° E.

**Weather.**—The temperature attains about 88° Fahr. in July, and is lowest about January—82°; the daily range is about 9°.

Rainfall about 125 inches; April to November are the rainy months, but rain falls in every month, the least being about February, when the amount is one or two inches.

Lat. 5° 59' N.  
Long. 116° 4' E.

**JESSELTON.**—The town of Jesselton is situated on the mainland abreast the south-east end of Gaya island. It is the principal port on the N.W. coast of Borneo and is the terminus of the railway which runs from there to Weston (in Bruni bay) and Tannan (Fort Birch) on the Padas river, with a junction at Beaufort.

**Supplies.**—Beef, bread and vegetables can be obtained at a reasonable price, fowls are fairly plentiful, and fish can be procured at the local market.

**Communication.**—The inter-insular steamers of the N.D.L. Line call fortnightly, both outward and homeward, and run in communication, at Singapore, with their ordinary mail steamers between Europe and the East.

There is telegraphic communication with Sandakan and Labúan, and from thence to Hong Kong and Singapore. Also with Ambong bay and Kudat harbour.

**LIGHT.**—A *fixed red* light is exhibited from an iron framework, at an elevation of 46 feet above high water, on the end of Jesselton pier. It is not to be depended on.

**Tides.**—It is high water, full and change, at 10h. 15m., springs rise 5½ feet, neaps range 2½ feet.

**Directions.**—Only small and handy vessels of light draught should attempt the very narrow South channel into Jesselton harbour, in which in one place there is only 10 feet water. The channel is marked by red and white beacons through its whole length, the red beacons being on the Jesselton side of the passage.

The ordinary approach to the harbour is from the northward:—Bring Lipat point to bear S. 34° E. and steer for it on that bearing, which will lead between the Plompung reef and Creighton patch; when the godown on the pier bears S. 6° E. steer for it, this course leading between Gueritz shoal and Grieve reef, after which the ship can be anchored as convenient in 5 to 7 fathoms, or be taken alongside the pier which has 23 feet at low water at its outer end.

**GAYA and SAPANGÁR BAYS** lie between the northern point of Gaya island and Kaetan point within Gaya head ; Kaetan peak lies about  $2\frac{1}{2}$  miles north-eastward of the point. Sapangár, Udar, Udar Kechil, and Udar Tiga, are a group of islands fronting Sapangar bay, and forming the most secure harbour on this coast ; it is of considerable extent and is available for all classes of vessels. There are a few shallow patches in the south-eastern part of Gaya bay, which will be seen on the plan, but the outer portion of Sapangár bay is apparently free from danger. The coral reef fronting the entrance to Kabatúan river continues round the shores of the bay to a distance of 3 to 4 cables, with two detached rocks about one cable from the edge of the reef on the eastern side of the bay.

The best anchorage is between Gaya and Sapangár islands ; anchorage may be taken in depths of from 8 to 12 fathoms, off the river, or nearer the head of the bay, bearing in mind that the upper part has not been sounded. Lutut point just open eastward of Gaya island, leads up Sapangár bay. The channel between Sapangár island and Udar shows deep soundings, but the space within has not been examined ; this channel and the others northward of it had better be avoided except by those locally acquainted.

**Kabatúan river**, about half a mile wide at the entrance, is reduced by banks on either side to a width of about one cable ; the entrance may be distinguished by a yellow sandstone bluff on its northern, and the abrupt angle of the coast on the southern, shore.

The outer bar appears to be composed of coral knolls, being a continuation of the line of reef fronting the shore northward from Iinanám river. There are gaps in this through which, at high water, small vessels might enter the river. The mouth is nearly closed by a small sand delta, near the southern end of which the deepest water was found.

A few miles within the river the water is fresh.

Kabatúan river is the principal trading river, small craft enter it.

**Beacons** are placed to mark the extremities of the coral reef bordering the bight off the river entrance. The starboard-hand beacons approaching the pier are painted white, and the port-hand beacons are painted red.

**Gaya head**, the northern extreme of Gaya and Sapangár bays, is bluff and steep-to beyond a short distance.

**MANGALUM ISLAND**, in the offing, at about 25 miles west-north-westward of Gaya island is circular in shape and about one mile in diameter ; the land is very low, the highest part being only a few feet above the level of the sea ; the tops of the trees are visible however, at the distance of about 12 miles. The island is surrounded by a coral chain,

Charts, 2,111  
[2,544].  
955 [2,585].  
Var. 2° E.

Lat.  $6^{\circ} 31' N.$   
Long.  $115^{\circ} 0' E.$

Lat.  $6^{\circ} 11' N.$   
Long.  $115^{\circ} 36' E.$

Charts, 2,111  
[2,594].  
2,109 [2,580].  
Var.  $2^{\circ}$  E.

broken only at the south-east portion, where vessels may enter and anchor close to the shore.

Wood for fuel and other purposes is abundant; the trees grow straight, and there is a great variety. Water is found in ponds close to the beach, but they communicate with a swamp in the centre of the island.

**Reefs.**—South-westward of the island the reef is said to extend for 6 miles; off the east end, rocks on which the sea breaks, and coral patches are said to extend several miles. This extent of reef is not shown on the chart, but the few soundings given are very irregular; a coral patch, with its position uncertain, is reported to exist at  $4\frac{1}{2}$  miles in a N.E. by E. direction, and a patch of  $4\frac{1}{4}$  fathoms is charted on this line at the distance of 8 miles; the island should be given a very wide berth.

On the north side for the distance of 10 miles, the depths are also very uneven, but a not less depth than  $4\frac{1}{2}$  fathoms was found, though shoaler water may exist.

Lat.  $6^{\circ} 2'$  N.  
Long.  $115^{\circ} 32'$  E.

**Shoals.**—A shoal area about 4 miles in extent with depths of from  $4\frac{1}{2}$  to 6 and 9 fathoms, lies between the bearings of S.S.W. and S.W. by S., distant from 9 to 13 miles from Mangalum island. A similar area lies about 5 miles further south in the direction of Tega island. These shoal spaces should be avoided as the soundings are very sparse and unknown dangers may exist.

**Tides.**—From four days' observations in the month of January, by Lieutenant Gordon (viz., from the full moon to the fourth day after), it was high water at Mangalum island invariably about 11 p.m. and low water at 6.45 a.m., the greatest rise of tide being 5 feet; there was only one flood and ebb in 24 hours.

\*Lat.  $6^{\circ} 7'$  N.  
Long.  $115^{\circ} 20'$  E.

**SARACEN BANK.**—H.M. surveying vessel *Saracen* in 1854, on her passage from Labúan to Hong Kong, discovered an extensive coral bank, having generally from 2 to 4 fathoms water over it, but full of dry patches and coral knolls with but a few feet water over them. The bank is 5 or 6 miles in diameter, and its centre\* bears W. by S.  $\frac{1}{2}$  S., distant 14 or 15 miles from Mangulum island.

Dangers had been seen in this locality before, but their positions were uncertain. It seems probable that other dangers may exist hereabouts besides those known.

\* Lat.  $6^{\circ} 6'$  N.  
Long.  $116^{\circ} 4'$  E.

**COAST.—Gaya head\* to Ambong bay.**—Vessels working northward along this coast must not stand too far off, as there are numerous reefs off the east side of Mangalum. At 7 miles from the shore, during the strength of the north-east monsoon, a strong current was found setting to the north-eastward.

**Menkábong bluff**, about 5 miles north-eastward of Gaya head, is a high crowned peninsula, fronted by a reef, with a sandy beach connecting it with Menkábong river, situated about a mile south-westward. Charts, 2,111 [2,584], 2,112 [2,596], 1,778 [2,597]. Var. 2° E.

**Menkábong river** can be entered by a craft of 7 to 8 feet draught; there is a fishing village at a short distance within the entrance.

**Tawálan river** lies nearly 4 miles north-eastward of Menkábong bluff, and is fronted by the shore flat to the distance of about half a mile. In the entrance there is a spit extending from the north point dry at low water; boats can however enter southward of it towards high water. Within is a fishing village.

There is a depth of 3 fathoms within the bar, which is not troubled by rollers, and the river is reported to be navigable for boats as far as Kini Balu lake.

**Suláman river.**—At 2 miles northward of the Tawálan is the broad mouth of the Suláman with a depth of about 6 feet on its bar. Immediately within it increases to 3 fathoms, the channel apparently deepening near the southern bank. The stream is rapid. At 2 miles up it opens into a lake some 2 miles square in which are depths of 2 to 4 fathoms; about 3 miles up the river beyond the lake is the village of Sum Sum.

The coast from Suláman river trends  $7\frac{1}{2}$  miles north-eastward to cape Ambong and is fronted by a shallow bank to the distance of three-quarters of a mile in places.

**AMBONG BAY** lies within cape Ambong, and between the point eastward of the cape and Perunjuk point is nearly a mile wide; this is reduced to about half a mile between the shoals off both points. The bay has depths of 6 to 8 fathoms over the greater portion of it, and the inner bays on either side, with depths of 4 to 5 fathoms, will afford shelter according to the monsoon. Lat. 6° 19' N.  
Long. 116° 17' E.

**Aspect.**—Approaching from the northward Ambong bay may be recognised by the peculiar projection of high peaks, as it were, into the sea. Northward of the bay will be noticed the island of Usukan, showing as a black bushy cone; the mountains near it on the mainland appear with rounded summits, sloping into apparently level land. At the head of the bay will be seen the high ranges skirting it, and if sufficiently clear the blue tinted mountain of Kini Balu, 13,700 feet high, in the distance. To the southward, the Ambong range, clothed with trees from base to summit, stand in the foreground sloping gradually towards Suláman river, where the high ranges cease, excepting at 10 to 15 miles in the interior.

**Cape Ambong, shoals.**—Cape Ambong is moderately bold, the land at half a mile within rising to a height of 200 feet. Immediately off the cape foul ground extends about one cable, but off the eastern side of the

Charts, 2,111  
[2,594].  
2,112 [2,596].  
1,778 [2,597].  
Var. 2° E.

Lat. 6° 19' N.  
Long. 116° 18' E.

cape to about a quarter of a mile. Telur island, with Teluk and Perunjuk points, are foul to the distance of one or  $1\frac{1}{2}$  cables, but the bights between within the soundings shown on the plan are probably shallow.

**Shoals in entrance.**—A shoal, a quarter of a mile in extent, with  $2\frac{1}{2}$  to 3 fathoms and 6 to 8 fathoms around, lies with cape Ambong bearing S.  $\frac{1}{2}$  E. distant 6 cables; at 3 cables north-eastward of this shoal is another of nearly the same extent, with 2 fathoms water in some parts, from the northern end of which, cape Ambong bears S. by W.  $\frac{1}{2}$  W., distant  $8\frac{1}{2}$  cables. A  $4\frac{1}{2}$ -fathoms patch lies nearly midway between these two shoals.

**Directions.**—The approach to Ambong bay is easy. Vessels bound there from the northward with Kini Balu visible, should bring it to bear S.E. and steer for it, which will lead in the best water. Perunjuk point between the bearings of S.E. and S. by E. will lead in northward of the shoals in the entrance; give that point a berth of about 2 cables, thence proceed to the desired anchorage.

From the south-westward, round cape Ambong at the distance of 2 cables, passing between it and the outlying shoals with Perunjuk point bearing E.  $\frac{1}{2}$  S., until about 4 cables from that point, thence to the anchorage. Or, to enter northward of the outer shoals, keep the whole of Usukan island open of Sak point, bearing N.E.  $\frac{1}{2}$  N., or mount Roberton in line with Jagu island, N.E. by E.  $\frac{1}{2}$  E., until Perunjuk point bears southward of S.E.; then proceed as before from the northward.

In fine weather the shoals will probably be visible from aloft.

**Anchorage.**—A berth may be taken in a depth of 5 to 6 fathoms, about 3 cables S.E. of Perunjuk point, with the eastern house on Ambong beach open of Teluk point.

This anchorage is the better for sailing vessels quitting the port, as if farther in, before way could be gained not more than a half-mile stretch would be available until being compelled to tack.

**The town** of Ambong is situated at the south-east head of Ambong bay, and is probably a place of some trade.

**Supplies.—Trade.**—Bullocks, goats, fowls, eggs, &c. can be purchased in Ambong at moderate prices. Beeswax, pepper, camphor, birds' nests, and other Bornean produce is exported.

There are two watering places. One immediately to the northward and opposite to Ambong town; the other, and the most convenient (if previously cleared above its run) is at the beach north-eastward of the anchorage. The quantity of water available depends much on the season.

**Tangah and Saundal bays** lie between Ambong bay and Saundal point and afford anchorage exposed to westerly winds in depths of from 7 to 8 fathoms. The upper part of Tangah bay has not been

examined ; Jaga, a cliffy sandstone island, stands on the south end of the reef extending from Saundal point.

Charts, 2,112  
[2,596].  
1,778 [2,697].  
Var. 2° E.

**Sak point.—Rock.**\*—Within the depth of 13 fathoms north-eastward of Saundal point there is reason to believe that sunken rocks exist ; one, awash at low water and surrounded by a coral bank to the distance of 2 cables north-westward, lies W.  $\frac{1}{2}$  S. 3 cables from Sak point. It should be given a wide berth. The clearing marks are Tangah point open of Saundal point, S.  $\frac{1}{2}$  E., and the point eastward of Sak point open, E. by  $\frac{1}{2}$  S.

**USUKAN BAY**, situated about 4 miles northward of Ambong bay, affords safe anchorage, has an excellent watering place, and is the only convenient spot for communicating with Abai river.

**Slime rock**, dry at low water, is situated on the south extreme of a shoal one-third of a mile in extent, lying off the south-west side of Usukan island ; from the rock the west extreme of the island bears N.E.  $\frac{1}{2}$  N. about 6 cables. The shoal is connected by a sunken ridge with the island, with depths under 3 fathoms in places.

**Directions.**—From the southward, observe the clearing marks for the rock off Sak point ; from the northward, give Slime rock a berth of about 3 cables ; thence haul up for the head of the bay, anchoring as requisite in 7 to 9 fathoms. The several points of the bay are foul to a short distance.

**Water** is obtainable from the streams at the head of the bay, except possibly at the end of a long drought.

**USUKAN ISLAND**, fronting the Abai river entrance, is a prominent feature on the coast, standing out clear from the land, when seen from a vessel near the coast. It is high, conical, well covered with timber, and at the times of low water lowest springs is possibly connected with the shore ; one foot water was found in the passage when examined.

**A rocky patch**, dry at low water springs on which the sea breaks, lies N.  $\frac{1}{2}$  E. distant 1 $\frac{1}{2}$  miles from the west extreme of Usukan island. The entrance to Abai river, open eastward of Usukan, bearing S.S.E., leads eastward of the patch, and Saundal point well open westward of Slime rock, bearing about S. by W., leads westward ; the latter two objects in line lead over the rock.

**Mayne rock**, about 3 cables in length, with a depth of 1 $\frac{1}{4}$  fathoms, lies with the west extreme of Usukan bearing S.S.E.  $\frac{3}{8}$  E. distant 3 $\frac{1}{4}$  miles. This rock was reported by the British North Borneo Company's steamer *Petrel* in 1893, and it lies in the usual track of vessels navigating this coast.

Chart, 2,112  
Lat. 6° 25' N.  
Long. 116° 20' E.

**ABAI PORT AND RIVER.**—Abai port is available for vessels of 9 feet draught at low water, and 12 to 14 feet at high water, by its north-eastern entrance.

For boats only, the passage from the westward, southward of Usukan, should be used, as the northern entrance is troubled by rollers; there will be possibly 3 feet water at half tide.

The bottom within the port is hard sand, and, unless vessels above 6 feet draught pass into the river, where 3 and 4 fathoms, mud, will be found, they are endangered by the swell and rollers, which would cause them to strike heavily. They must not therefore calculate on anchoring in the outer harbour.

**Supplies.**—Abai village is situated at Abai point. Water of fairly good quality can be obtained from wells. Cattle are occasionally procurable. The North Borneo Company's former station has been withdrawn.

**COAST.**—The beach from Abai river to the entrance of the Tampassuk river, a distance of about  $3\frac{1}{2}$  miles, is nearly straight, sandy, and from the very shelving nature of the whole extent of coast up to the Ant islets, constantly subject to heavy rollers, rendering landing dangerous, if not impracticable. In standing towards this coast it is advisable not to open Usukan island of the land about Sak point, or to a less depth than 15 fathoms.

Lat. 6° 25' N.  
Long. 116° 23' E.

**Tampassuk river** is barred by a sandbank, over which at high water there is probably 12 feet, but at low-water springs, not more than 6 feet. In November 1844, owing to the strength of the current from the river opposed to the swell, which produced unpleasant curls and frequent breaks, it was dangerous for boats entering. Immediately within the river the water deepens to 3 or 4 fathoms, which depths, it was stated, continued up to the town, probably to fort Alfred.

**Pandassan river.**—From Tampassuk river the coast is a sandy beach as far as Pandassan river, near which it terminates. The entrance appeared to be studded with rocks projecting from the cliffs of the opposite shore, and rollers prevented ingress. The village of same name is about one mile up.

**Kranga point.—Ant islets.**—Kranga point, situated about a mile northward of Pandassan river, is fronted by a reef studded with rocks to about three-quarters of a mile. On this reef near the point are the two Ant islets. About a quarter of a mile beyond the reef are the Ant rocks, an isolated group above water and steep-to.

**Three-feet rock** on which the sea breaks, is awash at low-water springs, steep-to, and lies 3 miles from the shore of Tampassuk bay, with the Outer Ant islet bearing N.E. by E.  $\frac{1}{2}$  E.  $4\frac{1}{2}$  miles, and Usukan island

just open of the land about Sak point ; if the objects overlap, a vessel will pass outside the shoal. A depth of 20 fathoms should be preserved during the night when in this neighbourhood.

**Coast.**—From Kranga point the coast trends north-eastward about 8 miles to Bisa island ; the point a little north-eastward of Gasap point, is fronted by a reef with rocks on it to the distance of about three-quarters of a mile and steep-to ; the coast on either side is fronted by the shore reef to about 3 cables in places. Landing is difficult.

**Bisa island or Black peninsula,** is high, composed of black basalt crowned by trees, and connected with the mainland by a narrow isthmus over which boats may be hauled. The shores on both sides are rocky, but tolerably protected from the swell.

**OFF-LYING ISLANDS AND DANGERS.**—**Mantanani islands**, situated between 12 and 17 miles W. by N. of Bisa island, consist of two coral islands, and an islet named Nob. Nob islet\* and the north-west end of Tree island, the eastern one, are tolerably high ; the western island is about two-thirds the height of these. These islands are uninhabited, except during the season when the edible birds' nests are collected from the caves which exist here.

There is good anchorage within half a mile of the reef on the south side of Tree island, with Nob islet open ; landing is easily effected. The channel between Nob and the western island should not be used, as other shoals may exist ; 3 fathoms is charted in its fairway. There is no inducement, beyond wooding, for any vessel to touch at this island.

**Tringganu shoal.**—The North German Lloyd Company's s.s. *Tringganu*, on 7th March 1903, struck on a shoal north-eastward of Tree island, from which the south-east point of that island bore S.  $39^{\circ}$  W., distant  $2\frac{1}{4}$  miles, and Nob island S.  $71^{\circ}$  W. The depth upon the shoal was not given, but the vessel sustained considerable damage, and remained fixed until lightened ; a good berth should be given by vessels passing.

**Shoals.—Caution.**—The Admiralty charts show, in faint dotted outline, several banks passed over by vessels at various times, westward and south-westward of the Mantanani islands. Over most of these the least water shown is 6 or 7 fathoms, but upon one of them there is only 5 fathoms. There is every reason to believe that many shoal patches may exist in this neighbourhood, and every caution must be used when navigating these waters. H.M.S. *Riflemen* passed over a bank at night with as little as 4 fathoms, lying S.W. by W. about 17 miles from Nob island of the Mantanani group.

**St. Joseph rock**, on which the French barque *St. Joseph*, of 10 feet draught, struck in 1877, is said to lie in the vicinity of the

Chart, 2.112  
[2,596].  
Var. 2° E.

Lat.  $6^{\circ} 42'$  N.  
Long.  $116^{\circ} 20'$  E.

Lat.  $6^{\circ} 42'$  N.  
Long.  $116^{\circ} 23'$  E.

Chart, 2,112  
[2,598].  
Var. 2° E.

4-fathoms patch, passed over by the *Riflemen* in the position given in the margin, or about 18 miles N.W. from cape Ambong. At the time of the vessel striking, Kini Balu mountain bore S.E., and the estimated distance from the nearest point of land was 15 to 17 miles; immediately afterwards a depth of 4½ fathoms was obtained.

**South Furious shoals**, a group of coral patches lying from 5 to 10 or more miles north-westward of the Mantanani islands, were discovered in August 1859, by H.M.S. *Furious*, and examined, in 1863, by the *Riflemen*, which vessel anchored upon a coral bank, with 7 fathoms water, barely half a mile in extent, N.N.W. ¾ W. nearly 7 miles from the western extreme of Mantanani islands.

About 2 miles S.E. of this coral bank is a bank with 6 fathoms, the least depth known. At about 2 miles S.S.W. of the same bank is another of 7 fathoms, about a mile in extent; westward and south-westward of this bank are other and more extensive banks, the limits of which were not determined. These banks are steep-to, with very irregular depths around them.

Lat. 7° 1' N.  
Long. 116° 19' E.

**North Furious shoals** are three coral patches lying about 20 miles northward of the Mantanani islands. These were also examined in the *Riflemen* and from the vessel's position at anchor in 11 fathoms, Nob islet, of the Mantanani group, bore S. ¾ E., and Banguey peak E. by N. ¾ N. These shoals extend N.W. by N. and S.E. by S. nearly 2 miles; the least water found upon them was 7 fathoms. The depths around are very irregular.

Chart, 287 [2,598].  
Lat. 7° 6' N.  
Long. 116° 24' E.

**Shoal.**—The American ship *Big Bonanza*, drawing 17 feet water, struck on a shoal situated about 7 miles north-eastward of North Furious shoals, with depths of 15 fathoms at a short distance from it. From the shoal the highest part of Sampanmangio point bore E. ¾ S., and Nob islet S. ½ W.

Discoloured water is charted as extending about 3½ miles in a N.E. by E. direction from this shoal.

Banks of 6 and 10 fathoms are also charted at about 3 and 8 miles respectively east-south-eastward of the position (approximate) given.

Lat. 6° 52' N.  
Long. 116° 19' E.

**Barton rock** appeared on former charts as awash, and as being situated 9½ miles North of the Mantauani islands. The *Riflemen* passed over this position without finding any indication of the rock, but circumstances did not allow of a prolonged search.

**A bank**, about 3 miles in length, is charted about 4 miles eastward of Barton rock, with depths of 7 to 9 fathoms.

**COAST.—Bisa point to Agal point.**—The coast between these two points, about 14 miles apart, is very irregular; about midway

is Ganda head with a bay on either side. The southern bay has not been examined near the shore, but two reefs with rocks above water, southward of Pirate river, are charted from a third to about two-thirds of a mile off shore. Pirate river has a conical rock, named Beehive, off its mouth.

**White Rocks**, situated  $3\frac{1}{2}$  miles N.N.E. from Bisa island, and 2 miles from the shore, consists of two rocks surrounded by a reef extending  $2\frac{1}{2}$  miles in a N. by E. direction, and nearly a mile in breadth. On the northern part of this reef are several rocks above and below water, named White Rocks reef.

A doubtful shoal with 4 fathoms water and 10 to 12 fathoms around, lies  $4\frac{1}{2}$  miles North from White Rocks, and  $1\frac{1}{2}$  miles W. by S.  $\frac{1}{4}$  S. from Ganda head; shoaler water may exist here.

**Ganda head**, a rocky bluff, and the bight close southward of it, is foul to the distance of about half a mile.

**Agal bay** lies about midway between Ganda head and Agal point. It is nearly a mile wide, but blocked by reefs extending from both shores; the Garu river or creek discharges into its head which is shallow. The bay is said to afford secure anchorage for small craft in a depth of 4 fathoms during the north-east monsoon period.

A patch of 3 fathoms lies a mile south-west of the north point of Agal bay, not far from the edge of the reef fronting the point.

**Agal point** (Tanjong Agal Agal), derives its name from a species of fucus which is collected on its rocky ledges by the fisherman for sale, similar to birds' nest and trepang.

**Reef.**—A narrow reef studded with rocks extends  $1\frac{1}{2}$  miles W. by N. of Agal point, and is steep-to on both sides, the lead affording no warning.

**Batomande rock**, composed of yellow sandstone and 40 feet high, lies nearly  $2\frac{1}{2}$  miles from Agal point on the same bearing as the reef; its surrounding reef is steep-to and separated by a narrow passage from Agal point reef.

In proceeding north-eastward a distance of 3 miles from the shore should be observed from Agal point, it not having been surveyed. The rollers were heavy on this shore. The Kurina, navigable for boats at high water, has its entrance on the sandy beach in front of a white cliff, 3 miles north-eastward of Agal point. A few other unimportant streams discharge into this bay.

**Katiga point** is a black rocky promontory 7 miles north-eastward of Agal point. It is foul to a short distance. The Ruru stream discharges northward of the point, barred by a reef. From Katiga point northward to Sampanmangio point, distant about  $5\frac{1}{2}$  miles, the shore is fronted by reefs and rocks to about half a mile in places. Kadua and Pertama points lie

Charts, 2,112  
[2,596].  
287 [2,598].  
946 [2,600].  
Var. 2° E.

Lat. 7° 24' N.  
Long. 116° 45' E.

between; patches extend about half a mile northward of the latter and northern one.

**N.W. POINT OF BORNEO.**—Sampanmangio point, the north-west extreme of Borneo and the western point of Marudu bay, is readily distinguished by the tall casuarinas which rise from its grassy bluff, and by the island of Kalampunian off it.

**Kalampunian island**, one mile northward of Sampanmangio point, is of sandstone formation, similar to the nearest bluff of that point, and rises abruptly from a flat to the height of 40 feet. The flat is of considerable extent, and composed of detached reefs.

There is a safe channel nearly half a mile wide between it and the mainland, having depths of 7 and 8 fathoms. The dangers are visible and are easily avoided by a careful look-out from aloft.

**MARUDU BAY**, at the head of which lie Marudu river and village, is about 25 miles in length in a southerly direction, and about 13 miles in width at its entrance, in which are depths of 13 to 17 fathoms, decreasing gradually towards the head of the bay, which is shallow to the distance of from 2 to 3 miles. The eastern shore is apparently foul to nearly the same distance.

**Anchorage** may be obtained off Marudu river in 7 fathoms, with Woody island bearing N.W. by W.  $\frac{1}{4}$  W., and Pirate point North.

**Tides.**—It is high water, full and change, in Marudu bay, at 10h. 30m.; springs rise 6 to 8 feet.

Lat. 6° 53' N.  
Long. 116° 53' E.

**KUDAT HARBOUR**, situated on the western shore of Marudu bay, affords anchorage in 4 to 7 fathoms water, sheltered from the swell during the north-east monsoon by a reef which extends about three-quarters of a mile from its north entrance point.

**Sandilands rock**, with 6 feet least water, and situated in the centre of the entrance, is about 150 yards in length east and west, and 50 yards in breadth. There is a pile lighthouse on it; *see* next page.

**Witti rock** with less than 6 feet water, lies N.  $\frac{3}{4}$  E. 2 cables from Sandilands rock, with a patch of 7 feet half a cable south-east of it on the same bank.

**Gueritz rock**, with about 3 feet water, lies S.S.E.  $\frac{3}{4}$  E. 3½ cables from the harbour jetty, and is marked at its south extreme by a wooden beacon 12 feet in height, surmounted by a white top-mark.

Gueritz rock forms the south extreme of the bank which stretches off three-quarters of a mile between Bornugus and Second points. A patch of 2 fathoms lies about a cable off the eastern edge of this bank; at 3 cables northward of Witti rock.

**Datum rock**, only covered at the highest springs, lies on the edge of the bank fronting the shore westward of the harbour jetty.

Charts, 287  
[2,598].  
946 [2,600].

Var. 2° E.

**Tigasamil spit** extends  $3\frac{1}{2}$  cables north-eastward of a point of the same name, with depths of about 4 feet, increasing to  $1\frac{1}{2}$  and 2 fathoms at 2 cables beyond, with 11 to 12 fathoms close-to; the north-east extremity of the spit is marked with a beacon in a depth of 12 feet. A reef, which dries, extends 2 cables northward of the point within Tigasamil, with Tern rock 4 feet high close to its eastern edge.

Lat.  $6^{\circ} 52' N.$

Long.  $116^{\circ} 53' E.$

**LIGHTS.**—From a pile beacon erected on Sandilands rock, is exhibited a *fixed* light visible at the distance of about 2 miles, and showing *white* when bearing from N.  $20^{\circ} W.$ , through west, to S.  $78^{\circ} W.$ ; *red* from S.  $37^{\circ} W.$ , to S.  $21^{\circ} W.$ ; *red* from S.  $53^{\circ} E.$ , to S.  $83^{\circ} E.$ ; *white* from N.  $69^{\circ} E.$ , through north, to N.  $13^{\circ} W.$ ; obscured in other directions.

A *fixed red* light is exhibited from the harbour jetty, visible seaward, but obscured over the western part of the harbour.

**Directions.**—After passing Kalampunian island, the coast should not be approached within 2 miles, and when abreast of First point, a remarkable hill will be seen southward of Kudat harbour. This hill, kept open eastward of the islet off Tanjung Tigasamil, bearing S. by W.  $\frac{1}{2} W.$ , will lead eastward of the spit extending from Second point, and of Sandilands rock; and when Johnstone bluff at the head of Kudat harbour bears W.  $\frac{1}{4} N.$  it may be steered for, passing between the pile beacon light on Sandilands rock and Tigasamil spit. A course may then be shaped for the anchorage, taking care to avoid Gueritz rock.

If entering at night, and having passed southwards of Sandilands light, the jetty light will afford facilities for selecting an anchorage.

**Tides.**—It is high water, full and change, in Kudat harbour at about 10h.; springs rise 6 to 8 feet.

**Kudat**, the settlement of the North Borneo Company, is situated on the north point of the entrance to the harbour; it is connected with the general telegraphic system *vid* Labúan.

**Climate.**—The mean maximum temperature is  $87^{\circ}$  Fahr., and the mean minimum  $74^{\circ}$ . From May to August the temperature reaches  $92^{\circ}$  at times. Rainfall is about 130 inches. December to March are the most rainy months, about 85 inches falling in that period; the remainder is distributed over the other months. The south-west monsoon is the most unhealthy period at Kudat; fever is then prevalent and rather severe; whilst at the opposite season, with the wind coming across the sea, it is almost absent.

**Jetty.**—Vessels of 16 feet draught can lie afloat alongside the jetty at the south-east extreme of the settlement.

Chart. 287  
[2,578].  
Var. 2° E.

Lat. 6° 50' N.  
Long. 117° 4' E.

**Supplies.**—The water supply is not good. Cattle and vegetables can usually be procured. No coal is obtainable.

**BINKOKA RIVER** lies on the eastern shore of Marudu bay, opposite Kudat harbour. A bank which dries extends a good mile off its north point of entrance with depths of less than 3 fathoms as far as 3 miles from the entrance, and with anchorage in depths of 5 to 10 fathoms beyond that distance. There is apparently about 3 feet on the bar at low water, which breaks, and 12 to 18 feet in the channel within.

Talaga village is situated on the north bank of Binkoka river, about one mile within the entrance.

The coast southward of the river is low with high trees on it.

**Selimpadan.**—There is said to be a well-sheltered deep water harbour at Selimpadan or Selimpodor, about 10 miles southward of Binkoka river, with an excellent supply of fresh water and a good site for a town ; it has not been surveyed.

**Coast.**—The land northward of Binkoka river recedes about a mile, and forms a shallow bay 3 miles wide, the north point of which is composed of red cliffs, about 20 feet high, with foul ground extending half a mile or more from it.

**Cape Mafsie** is the east point of Maruda bay ; it has white cliffs and there is a rock off it 15 feet high. For the coast eastward, see Eastern Archipelago, Part I.

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General chart, 2,6606 [2,679].

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## CHAPTER VII.

NORTH PART OF BORNEO TO SOUTH PART OF PALÁWAN.

### BALÁBAC STRAIT AND ADJACENT ISLANDS.

Between the north part of Borneo and the south part of Paláwan are several smaller islands, of which Balambángan, Banguey, and Mallawallé, with many islets and rocks, form the southern group. Northward of this group is Balábac strait, which connects the China, and Sulu or Mindoro, seas. The elevated island of Balábac, the northern limit of this strait, with the smaller islands of Mantangule, Bankálan, Bugsuk, Pandannan, and others form the northern group.

**BALAMBÁNGAN ISLAND.—General remarks.**—This island, situated 11 miles north-eastward from the north extreme of Borneo, is of irregular shape,  $13\frac{1}{2}$  miles in length, in a north-east and south-west direction, with an extreme breadth of about 6 miles. The composition of the elevations of Balambángan island varies between limestone, basalt, trap, and sandstone. All the rocks exhibit traces of violent convulsion.

The southern portion of this island presents a range of hills, the highest being 440 feet; there are also other elevations, one of which, Thumb peak, 314 feet high, near the south-west extreme of the island, is conspicuous; these elevations are terminated on the coast line by abrupt cliffs. The northern portion of the island is flat, but thickly covered with high trees. On the east side of Balambángan island are two inlets known as North and South harbours, both affording good drinking water.

Fuel may be obtained at any part of this island, and is similar in quality to the woods of Borneo grown on hard soil.

**Kalutan point**, the south extreme of Balambángan island, is fronted by several islets and rocks extending three-quarters of a mile in a south-easterly direction. At half a mile eastward of these is a coral patch with 3 fathoms water, with the point bearing W. by N.  $\frac{1}{4}$  N., distant one mile.

**Kalutan island.**—About three-quarters of a mile north-west of Kalutan point and half a mile from the shore is the small round island of Kalutan, 278 feet high, having a reef projecting nearly half a mile from its west side.

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General charts, 967 [2,650], 2,660b [2,679].

E 32369.

N

Charts 948 [2,601],  
966 [2,603].

Var. 2° E.

\*Lat. 7° 21' N.  
Long. 117° 0' E.

**Siagut shoal.**—Between Kalutan island and Buttun point, at  $5\frac{1}{2}$  miles northward of it, the reef extends nearly three-quarters of a mile from the shore, and the large bay north-east of Buttun point has less than 3 fathoms water, extending nearly  $1\frac{1}{2}$  miles from the shore; at 2 miles from Siagut point the north extreme of Balambángan island,\* lies Siagut shoal,  $1\frac{1}{2}$  miles in length, with less than 6 feet water over some parts of it; by keeping in depths of not less than 14 fathoms all these dangers will be avoided.

Reefs and shoals extend more than three-quarters of a mile from Siagut point, and a 3-fathoms patch lies N.N.W., nearly  $1\frac{1}{4}$  miles from it; vessels should, therefore, when rounding Siagut point give it a berth of 2 miles, or not come into less than 9 fathoms water.

**East coast.**—The whole of the east coast of Balambángan is fronted by coral reef outside which are detached dry patches here and there, but the 3-fathoms edge embracing these is, for the most part, distant half a mile from the shore. At  $1\frac{1}{2}$  miles south-eastward of Siagut point, and separated from the shore reef by a narrow passage, lies a coral shoal more than half a mile in diameter, having less than 6 feet water over some parts of it; eastward of this danger, in the channel between it and the reef surrounding Tiga islet, is a shoal of  $3\frac{1}{2}$  fathoms and another of  $2\frac{3}{4}$  fathoms; caution is therefore necessary when passing through that channel.

The shoals along the south-east coast are not easily discovered unless the sun be shining behind the observer; [southward of Saparok point the shore reef extends to the distance of  $1\frac{1}{2}$  miles.

Lat. 7° 13' N.  
Long. 116° 34' E.

**South harbour,** situated on the east side of the south extreme of Balambángan, is fronted by isolated shoals to the distance of about 2 miles with reefs on either side, for which see the plan. The channel abreast Raha, the south point of entrance, is a quarter of a mile wide between the reefs, with a depth of 7 fathoms.

**Directions.**—To enter this harbour requires close attention to the following directions as well as the lead and look-out, and it is not advisable to enter unless the reefs are visible from aloft. From the south-westward, having given Kalutan point a berth of at least a mile, haul nearer the shore, bringing Cone islet, the outer islet off Kalutan, to bear W. by S.  $\frac{3}{4}$  S. well open of the islets off Observatory point, which leads southward of the reefs off Raha point. When Raha point bears N.W.  $\frac{1}{2}$  N., haul up North, passing between Raha reef (the edge of which will be seen from aloft and probably marked by breakers), and the detached reefs to the eastward, looking out to avoid the 6-feet rocky patch lying  $2\frac{1}{2}$  cables eastward of Raha reef; round Raha reef at a prudent distance and haul in about W.  $\frac{1}{2}$  S. for the anchorage in a depth of 7 fathoms, in the fairway off the watering place.

**Water.**—Fresh water will be found on the south shore, about a quarter of a mile within Raha point. The reef prevents access until half flood.

**North harbour,** or Luk Barábok Barábok, offers greater convenience for anchorage than the South harbour, and is of much easier approach, the shoals being better defined.

It is not advisable to enter this harbour, however, unless the reefs are visible from aloft.

**Directions.**—From the south-westward, keep Kalutan point bearing westward of W. by S., to pass southward of Half Channel patch lying 2 miles S.E. by E. from Saparoak point, which has only 3 feet water and breaks at times. When Manyangit point, on Banguey island, bears N.N.E. steer for it until Battang point bears about N.W.  $\frac{1}{2}$  N.; then steer to pass between the latter point and the reef awash nearly a mile S.W. by S. of it, looking out to avoid a  $1\frac{1}{2}$ -fathoms knoll, lying half a mile from the shore, just within Battang point. A reef awash lies about  $3\frac{1}{2}$  cables north-west of this knoll; anchorage may be obtained in a depth of 10 fathoms, with the centre of this reef in line with Battang point, and Saparoak point bearing S.S.W.

The head of the harbour is known as Lung bay, and has depths of 5 to 7 fathoms between the reefs fringing its shores.

**Water.**—It was on the southern point of North harbour that the English establishment (abandoned in 1803) was situated. Two streams flow into the sea, one on each side of the ruins. The westernmost will, it is stated, even in the dry season, furnish about 15 tons of water during the day.

**BANGUEY WEST CHANNEL,** separates Balambángan and Banguey islands, and has a least breadth of about 2 miles abreast Battang and Manyangit points.

The southern portion is deep, with Half Channel patch previously referred to nearly in the fairway, but with a channel  $2\frac{1}{2}$  miles wide eastward of it.

**The northern entrance,** between Siagut and Samarang points, about  $8\frac{1}{2}$  miles apart, is obstructed by Tiga islet and its reef, and by Rifleman rock and other patches. The channel between Rifleman rock and Tiga is navigable and has depths of 6 to 7 fathoms in its fairway, but it would not be safe to reckon on more than 5 fathoms unless the channel were thoroughly buoyed; the rock is buoyed, but it must not be depended on. The channel along the Banguey shore seems also good, if buoyed. The channel westward of Tiga is narrower and more obstructed. They should only be navigated when the dangers are discernible.

Chart, 948 [2,601].  
Var. 2° E.

**Tiga islet**, situated in the northern entrance of Banguey west channel, is low and covered with trees; it is a little over half a mile in length, a quarter of a mile in breadth, and is surrounded by reefs fairly steep-to, extending about a mile in a northerly and southerly, and about three-quarters of a mile in other directions. The south-east extremity of the reef is marked by an iron tripod beacon, situated S. 52° E., distant one mile from the south point of Tiga islet.

The shoal westward of Tiga islet, and south-eastward of Siagut point, has been referred to. Patches of 2½ and 3 fathoms lie between that shoal and Tiga islet reef, in the fairway.

Lat. 7° 20' N.  
Long. 117° 5' E.

**Rifleman rock**, a small coral patch with 1½ fathoms water over it, and 5 fathoms close-to, lies in the fairway between Tiga islet reef and the Banguey coast dangers, with the south-west end of Tiga islet bearing W. ¾ N., distant 2 miles. Westward of the rock there are depths of 6 and 7 fathoms in the fairway.

**Buoy**.—A black buoy surmounted by a white ball has been placed on Rifleman rock by the B. N. Borneo Co., but it is not to be depended on.

About midway between Rifleman rock and the north-west coast of Banguey are patches of 2½ and 3 fathoms, on a bank about 2½ miles in extent north-east and south-west within the 5-fathoms limit, and with a depth of 6 to 7 fathoms in the channel between them and the shore.

**Labúan rock**, with 1½ fathoms water over it, lies in the fairway about 2 miles S.W. ¾ S. from Rifleman rock, and one mile N. by W. of Manyangit point.

Lat. 7° 21' N.  
Long. 117° 9' E.

**Samarang point** has a reef extending nearly three-quarters of a mile north-west of it, on which there is a sand cay about 2 cables within its extreme. Nearly 2 miles south-westward there is an islet on the reef fronting the shore.

The coast southward is foul only to about 3 cables, except in one or two places, for which see the chart.

**Directions**.—The channel between Rifleman rock and Tiga islet reef is available for vessels of moderate draught. If the buoy is in position on Rifleman rock there will be no difficulty. Coming from the northward, Battang point, bearing S.W. ¾ S., is apparently a good mark, leading between Rifleman rock and the beacon on Tiga islet reef; when Manyangit point bears S.E. course should be altered to pass half a mile westward of it; thence along the Banguey side at the distance of one to 1½ miles until southward of Half Channel patch, when course may be shaped to the westward as requisite. Banguey peak should not be brought northward of N.N.E. if near Molleangan island reefs.

**Tides**.—It is high water, full and change, in Banguey West channel, at 10h.; springs rise 6 to 8 feet.

**BANGUEY ISLAND** is  $1\frac{1}{2}$  miles in length in a north-east and south-west direction, and about 13 miles in breadth. The island is surrounded by a fringed reef, the south coast being faced by small islands, having deep water channels between, and large concealed channels behind, which formerly served as the principal rendezvous and hiding places for pirates. These small islands form part of the northern limit, and are included in the description of Banguey South channel. The west coast is included in the description of Banguey West channel, and the north coast in that of Balábac strait. Off-lying for several miles the north-east and east coasts of Banguey are numerous islands, islets, and dangers, as will be seen on the charts.

Chart. 948 [2,601]  
Var. 2° E.

**Aspect.**—There are several ranges, also some detached hills, on Banguey ; the highest, Banguey peak, 1,876 feet high, is at the north-west end of the island, and shows as a conspicuous object for more than 30 miles around. Viewed on a north-westerly, or opposite line of bearing, the apex appears as a nipple, but as this line of bearing is departed from the nipple shape becomes less apparent, and the summit assumes a rounded form. A range of hills extends to the eastward for a distance of 6 miles, with East hill at the extreme elevated 1,076 feet ; thence some smaller ranges lie in a northerly direction, and terminate near the coast in North hill, 742 feet high. About  $1\frac{1}{4}$  miles south-eastward of Banguey peak is a conspicuous hill 1,480 feet high.

Lat.  $7^{\circ} 17' N.$   
Long.  $117^{\circ} 6' E.$

**BANGUEY SOUTH CHANNEL**, leading from the China into the Sulu sea, is somewhat intricate, and requires careful navigation, being for the greater part of its length bordered by dangers, and with others near the fairway. The western entrance, about  $1\frac{1}{4}$  miles wide, lies between Outer shoal and Molleangan islands off-lying the coasts of Borneo and Banguey respectively.

Lat.  $7^{\circ} 31' N.$   
Long.  $117^{\circ} 1' E.$

The southern limits of the channel are formed by the North-west and North Borneo dangers, South channel dangers, the reefs off the northern part of Mallawallé, Mallawallé Eastern dangers, and Fairway shoal. The northern limits of the channel are, the islands which lie close-to, and appear to be part of the southern shore of Banguey, Carrington reefs, and South-east Banguey dangers.

A careful look-out aloft and with the sun in a favourable position is necessary for navigating the channel in safety. For directions, see page 203.

Balábac Main channel is considered much safer than any of the Banguey or Mallawallé channels, and is therefore preferable.

**ISLANDS AND DANGERS** on northern shore.—  
**Molleangan island**, 466 feet high, situated  $1\frac{1}{4}$  miles south-westward of the south point of Banguey, is  $1\frac{1}{4}$  miles in length east and west

Lat.  $7^{\circ} 5' N.$   
Long.  $117^{\circ} 3' E.$

Charts 948 [2,601], and three quarters of a mile in breadth, with reefs and rocks above water 1,220 [2,602].  
Var. 2° E.

extending three-quarter of a mile in a north-west, west, and south-westerly direction; the south-east and north-east sides of this island are steep-to. Several reefs with rocks above and below water lie nearly midway between Molleangan and Banguey.

At one mile south-west of Molleangan, lies Little Molleangan island, from which dangers extend a third of a mile eastward, and three-quarters of a mile westward, with depths of 13 to 17 fathoms close-to.

Lat. 7° 6' N.  
Long. 117° 54' E.

**South coast of Banguey.—Patanunam island,** three-quarters of a mile eastward of the south-west point of Banguey, is more than half a mile in extent, and 428 feet high; the summit is a useful object for determining a vessel's position when passing through the channel. The island is fringed by a coral reef projecting 2 cables from its south-west end, whilst off the north-east end a detached narrow reef extends nearly a mile in that direction.

**Pagassan island**, hilly in character, is about 2 miles in extent, and fringed by a reef which projects 3 cables from the southern part, with a rock awash at a cable beyond. Westward of the rock awash there are patches of 4 and 5 fathoms, the outer and most distant of which is situated one mile W. by S. ½ S. from it.

**Lampassan island** lies three-quarters of a mile eastward of Pagassan, and is about 3 miles in length; from its southern and eastern points coral spits, dry at low water, extend to the distance of three-quarters of a mile.

Lat. 7° 8' N.  
Long. 117° 7' E.

**Mitford harbour** is situated on the south side of Banguey island, and within the islands just described. There are three entrances to it; the middle and principal between Pagassan and the island westward of it is about one cable in width, and has depths of 7 to 10 fathoms. The western entrance and channel within has about 5 fathoms. The eastern passage is said to be nearly 2 cables wide, with depths of 7 to 8 fathoms, but this does not appear on the plan. H.M.S. *Plover* visited Mitford harbour in January 1898, when several uncharted dangers appeared to exist.

**Beacons**, made of the nibong palm, were formerly erected on the reefs on either side of the middle and western channels, and on some isolated reefs in the harbour, but as vessels visiting the place have reported them absent, it is probable that none now exist.

**Town.**—The settlement of Mitford, formed by the North Borneo Company, was situated on the north shore of the harbour, with a pier extending out to the edge of the reef which fronts it. The place was abandoned in 1882, and it has been reported that no sign of its existence remains.

**Water.**—The water supply is reported to be good.

Charts. 945 [2,001].  
1,220 [2,002].  
Var. 2° E.

At 8 miles from Mitford, at the foot of Banguey peak, is a German tobacco plantation, named Limbuak, on the river of that name, which discharges on the west coast of Banguey.

**Directions.—Middle channel.**—In steering for the entrance of the middle channel, the two patches one mile south-eastward of it must be avoided; the west extreme of Pagassan island bearing N.W.  $\frac{1}{2}$  N. clears the 4-fathoms patch to the eastward; and the same point bearing N. by W. clears the 5-fathoms patch to the westward. The summit of the hill (663 feet in height) close behind Mitford bearing N.W. leads through the centre of the middle channel, and midway between the fringing reefs on either side; when inside the islands, steer for the end of the pier. See the caution on charts.

The other entrances are not recommended.

**South-east part of Banguey.**—About half a mile eastward of Lampassan island a point extends from Banguey towards the channel, forming one side of an inlet choked by reef, the other side being a peninsula forming the south-east end of Banguey. A short distance off the point on the reef extending from it lie two islets, and from these a number of rocks, almost connected, extend in a S. by W. direction nearly  $1\frac{1}{2}$  miles. The south-east extreme of Banguey is bordered by reef, beyond which and off the mouth of the inlet just mentioned lie two large patches, the outermost being a mile from the shore reef.

**Carrington reefs**, situated about  $2\frac{1}{2}$  miles east-south-eastward from the east end of Lampassan, are composed of coral, for the most part dry at low water; they extend 4 miles in an east and west direction, and are one mile in breadth; at 4 cables from the north side of these reefs is a patch of  $2\frac{1}{2}$  fathoms. Between this shoal and the dangers extending from the Banguey shore is a channel three-quarters of a mile wide, but which, as a matter of ordinary navigation, no vessel would require to use. It is, however, practically available for small steam vessels, which may afterwards round the Carrington reefs and return into Banguey South channel; or they may proceed into the Sulu sea, either by the narrow and intricate passage between the shore reefs and those surrounding Bankawan and Latoan; or by Bankawan channel, a broader and much less intricate passage separating the Bankawan and South-east Banguey dangers.

The main channel, however, lies between Carrington reefs and those off the north part of Mallawallé, and this channel only should be used by strangers, taking care not to near the former dangers under a depth of 13 to 15 fathoms; the apex of Pagassan bearing W.  $\frac{5}{8}$  N. leads close to the southward, and the east end of Lampassan N. by W.  $\frac{1}{2}$  W. leads westward.

Lat.  $7^{\circ} 7' N.$   
Long.  $117^{\circ} 15' E.$

Chart, 948 [2,601].  
Var. 2° E.

**South-east Banguey dangers** comprise an extensive group of reefs and shoals  $10\frac{1}{2}$  miles in length, in an E. by N.  $\frac{1}{2}$  N. and W. by S.  $\frac{1}{2}$  S. direction, and nearly 5 miles in breadth, situated  $1\frac{1}{2}$  miles eastward of Carrington reefs. The west end of the group is defined by two small isolated reefs, dry at low water and steep-to; a good look-out is essential when nearing them, and the same precaution will have to be observed when passing through the channel, as the reefs forming the southern edge of these dangers are all steep-to. A space about 2 miles in extent, at the eastern part of South-east Banguey dangers, is studded by a number of coral patches with from one to 5 fathoms water, and from the outer, or eastern one, the summit of Latoan island bears N.W. by W.  $\frac{5}{8}$  W., distant  $9\frac{1}{2}$  miles.

Lat.  $7^{\circ} 10' N.$   
Long.  $117^{\circ} 20' E.$

**Bankawan channel**, separating Bankawan reefs from South-east Banguey dangers, is three-quarters of a mile wide at its narrowest part. The channel is nearly straight, and lies in a N.E.  $\frac{1}{2}$  E. and S.W.  $\frac{1}{2}$  W. direction, but it will be necessary to keep a good look-out for the reefs on either side: with proper precautions there will be no difficulty in taking a vessel safely through.

**ISLANDS and DANGERS on southern shore.—N.W. and North Borneo dangers.**—Lying off the north-west and north coasts of Borneo are a number of coral shoals, generally of small extent, some partially dry at low water, whilst others dry entirely, and two are marked by sand cays, which shine brightly in the sunlight. Those dangers only will be described which limit the channels proper for vessels to proceed by; to describe the others in detail would tend rather to confuse navigators, who can have no inducement to risk the safety of their vessels by venturing amongst them.

Lat.  $7^{\circ} 2' N.$   
Long.  $117^{\circ} 0\frac{1}{2}' E.$

**Outer shoal**, the largest of these dangers, forms the south-west limit of Banguey South channel; it is about a mile in extent and steep-to, with about 6 feet water, and a patch which dries on its eastern side. From its north-west end the summit of Little Molleangan bears N.E. by N., and is distant  $2\frac{1}{2}$  miles.

A sand cay, on the east side of a coral ledge nearly awash and steep-to, lies E. by S.  $2\frac{3}{4}$  miles from the north-east extreme of Outer shoal.

Nearly mid-way between Outer shoal and this sand cay is a coral patch with 6 feet water, and a depth of 15 fathoms around.

Another sand cay, in the centre of a coral ledge, lies one mile eastward of the former. These cays are useful as marking the limits of the channel on the Borneo side, and being composed of white coral sand, are conspicuous.

Nearly 3 miles E.N.E. from the eastern sand cay, is a 2-fathoms patch, with two ledges which dry, a short distance southward; from this shoal,

which is the most northerly of the North Borneo dangers, the summit of <sup>Chart. 948 [2,601].</sup>  
Patanunam bears N.N.W.  $\frac{1}{2}$  W., distant nearly 4 miles.  
<sub>Var. 2° E.</sub>

About  $1\frac{1}{4}$  miles E.  $\frac{1}{4}$  S. from the 2-fathoms shoal is the outer of two coral ledges lying close together, with Patanunam summit bearing N.W.  $\frac{1}{4}$  W., distant 5 miles. A 3-fathoms patch lies 3 cables E.S.E., and a ledge of rocks distant a little over  $1\frac{1}{2}$  miles in the same direction from these dangers; the latter is within a third of a mile of the reef fronting the Borneo shore to a distance of about 2 miles.

**Dangers in the fairway.—Petrel rock** is a narrow ridge of coral, about 40 yards in extent with 14 feet water and a depth of 12 fathoms close around. It lies with the south extreme of Molleangan island bearing N.  $84^{\circ}$  W., distant about  $3\frac{1}{2}$  miles.

**A patch** of  $5\frac{1}{2}$  fathoms lies about three-quarters of a mile eastward of Petrel rock, with Kalutan point bearing N.  $60^{\circ}$  W., and the hill 663 feet high, at Mitford, N.  $14^{\circ}$  W.

**Ten-feet rock**, the westernmost of the fairway dangers, is a coral head 70 yards in length, with a least depth of 10 feet, and 17 fathoms close around; it lies with Petrel rock bearing N.N.E.  $\frac{3}{4}$  E., distant about 7 cables. As other dangers may exist here, the utmost caution should be used when navigating in this locality.

**South channel dangers** comprise six coral reefs lying in the fairway eastward of Petrel rock, with irregular depths between. Three of these reefs lie in an east and west direction, about half a mile apart; the two westernmost dry at low water; the other is a strip of coral nearly three-fourths of a mile in length, with a rock nearly awash at its eastern extreme. A  $2\frac{1}{2}$ -fathoms patch lies S. by E.  $\frac{1}{2}$  E. 6 cables, and another with the same depth, N.E. by E.  $1\frac{1}{2}$  miles from the rock nearly awash. A patch of 4 fathoms lies nearly a mile N.W.  $\frac{3}{4}$  N. from the easternmost of the two patches which dry. Between the different dangers are passages which it is possible for vessels to pass through, but as this would serve no useful purpose, it is advisable to consider these shoals as a dangerous group.

**Clearing marks.**—The apex of Molleangan island bearing W. by S. leads northward of South channel dangers; the same object W.  $\frac{1}{4}$  N. leads southward, and about 3 cables northward of Petrel rock.

**Mallawallé island**, about 7 miles distant from the south-east part of Banguey, and the same distance from the north extreme of Borneo, is of irregular shape, 5 miles in length in a north-westerly and south-easterly direction, and about 4 miles in breadth. The island for the most part consists of ranges of hills from 400 to 500 feet high; but one range, towards the north-west end, attains the elevation of 562 feet.\* Close to <sup>\*Lat.  $7^{\circ} 38' N.$   
Long.  $117^{\circ} 17' E.$</sup>

General chart, 967 [2,650].

Chart. 949 [2,601]. the coast on the west side, is West islet; North-west islet lies a short distance off the north-west end; and North islet, low and nearly one mile in length, almost joins the north part of the main island.

The island is fringed by a reef which extends nearly a mile in places from the east, north, and west points, and to about half that distance from its south point.

A sand cay is situated on a reef about a mile in length at nearly the same distance north-east of Mallawallé North islet, with patches east and west of it, forming the south side of Banguey South channel; see the chart. Another sand cay marks the west end of a reef at about a mile off the east end of Mallawallé island; N.N.W.  $1\frac{1}{2}$  miles from the sand cay there is a narrow coral patch, half a mile in length, with a depth of 13 fathoms close around it.

**MALLAWALLÉ EASTERN DANGERS** comprise a large number of detached reefs and shoals which extend 10 or 11 miles in an easterly and south-easterly direction from Mallawallé. It is only the northern edge of these dangers, forming the south side of the eastern part of Banguey South channel, which require description, for there can be no object in risking a vessel amongst them.

\*Lat.  $7^{\circ} 34' N.$   
Long.  $117^{\circ} 22' E.$  At about  $2\frac{1}{4}$  miles N.E. by E. from the sand cay\* off the eastern end of Mallawallé island, is a small coral reef which dries, and has depths of 14 and 15 fathoms close around. One-third of a mile southward of this reef is a reef half a mile in extent, with less than 6 feet water over it. A cluster of reefs, occupying a space  $1\frac{1}{4}$  miles in extent, with 13 fathoms close-to on the northern side, lies a mile eastward of the coral reef just described; and E. by N.  $\frac{1}{2}$  N.,  $3\frac{1}{2}$  miles from the same danger is a reef half a mile in length, with 7 feet water on its northern end. This danger, being always covered, is not so readily seen as the others, and it is important to bear this in mind, as the shoal occupies a prominent position, bordering as it does on the deep water of Banguey South channel.

Lat.  $7^{\circ} 54' N.$   
Long.  $117^{\circ} 29' E.$

**The Straggler**, a small coral islet, with trees 20 feet high, is a useful object for assisting in the navigation of the eastern part of Banguey South channel. From it the outer extreme of the 7-feet reef just described lies N.W. by W.  $\frac{1}{2}$  W., distant nearly  $1\frac{1}{2}$  miles, while south-westward of the islet are many other dangers. The reef surrounding the islet extends  $1\frac{1}{4}$  miles in an easterly direction, and more than half a mile south-westward. About  $1\frac{1}{2}$  miles S.E. from the east extreme of Straggler reef and E. by S.  $\frac{1}{2}$  S. from the islet, is the outer edge of a reef having in some places less than 6 feet water; half a mile eastward of it is a  $3\frac{1}{4}$ -fathoms coral patch. Other dangers of the group extend 7 miles further to the southward.

Chart, 948 [2,601].  
Lat.  $7^{\circ} 7' N.$   
Long.  $117^{\circ} 30' E.$   
Var.  $2^{\circ} E.$

**Fairway shoal**, at the eastern entrance of South Banguey channel, is three-quarters of a mile in diameter, with a rock awash near its southern part, from which Straggler islet bears S.W.  $\frac{1}{8}$  S., distant  $2\frac{1}{2}$  miles. The rock awash is, however, only  $1\frac{1}{2}$  miles from the eastern extreme of Straggler reef, which limits the width of the channel southward of Fairway shoal ; the channel northward of the shoal is 3 miles wide. At  $1\frac{1}{2}$  miles eastward of Fairway shoal there is a patch of  $3\frac{1}{4}$  fathoms, half a mile in extent, with deep water around it.

**Directions for Banguey South channel.**—Attention to these directions must be supplemented by a vigilant and careful look-out from aloft. The best time for proceeding through from the westward is with the sun astern, when there is seldom much difficulty in making out the various dangers as the vessel advances. Balábac Main channel is, however, considered a safer route.

Having rounded Kalampunian island, off the north-west extreme of Borneo, steer for Molleangan islands bearing about East, and when about 5 miles from the reef encircling them, edge south-eastward, opening the summit of the larger island southward of the smaller island. Then steer to pass about three-quarters of a mile southward of the latter ; observing that the whole of Patanunam island should not be opened eastward of Molleangan island, until the summit of Little Molleangan bears N.N.E., which will lead clear of Outer shoal. Having passed Little Molleangan steer more to the north-eastward, keeping within a mile of Molleangan and Patanunam.

Having passed those islands, bring the peak of Patanunam to bear W.  $\frac{2}{3}$  S., and steer E.  $\frac{2}{3}$  N. through the fairway between the South channel dangers and the rock off the south end of Pagassan, until the sand cay off the north side of Mallawallé island is abeam, distant about a mile ; when an E. by S.  $\frac{1}{2}$  S. course will lead clear of the dangers off the northern side of Mallawallé. When the sand cay off the east extreme of that island bears South, distant  $2\frac{1}{2}$  miles, steer E.N.E., which course being preserved will lead one mile northward of Fairway shoal, into the Sulu sea, avoiding Maeander patch, &c., for which see Eastern Archipelago, Part I. Bearings of Straggler island will check the position of the vessel whilst westward of Fairway shoal.

**Mallawallé channel.**—Balábac Main channel is recommended in preference to Mallawallé channel. For Directions through Mallawallé channel, see Eastern Archipelago, Part I.

Lat.  $7^{\circ} 1' N.$   
Long.  $117^{\circ} 15' E.$

**BALÁBAC STRAIT.**—General remarks.—Balábac strait, leading from the China sea into the Mindoro or Sulu sea, lies between Balambángan and Banguey islands on the south, and Balábac island on the north. The greater part of this strait is occupied by coral

Chart. 948 [2,601]. the coast on the west side, is West islet; North-west islet lies a short distance off the north-west end; and North islet, low and nearly one mile in length, almost joins the north part of the main island.

The island is fringed by a reef which extends nearly a mile in places from the east, north, and west points, and to about half that distance from its south point.

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**MALLAWALLÉ EASTERN DANGERS** comprise a large number of detached reefs and shoals which extend 10 or 11 miles in an easterly and south-easterly direction from Mallawallé. It is only the northern edge of these dangers, forming the south side of the eastern part of Banguey South channel, which require description, for there can be no object in risking a vessel amongst them.

\*Lat.  $7^{\circ} 31' N.$   
Long.  $117^{\circ} 22' E.$  At about  $2\frac{3}{4}$  miles N.E. by E. from the sand cay\* off the eastern end of Mallawallé island, is a small coral reef which dries, and has depths of 14 and 15 fathoms close around. One-third of a mile southward of this reef is a reef half a mile in extent, with less than 6 feet water over it. A cluster of reefs, occupying a space  $1\frac{1}{4}$  miles in extent, with 13 fathoms close-to on the northern side, lies a mile eastward of the coral reef just described; and E. by N.  $\frac{1}{2}$  N.,  $3\frac{1}{2}$  miles from the same danger is a reef half a mile in length, with 7 feet water on its northern end. This danger, being always covered, is not so readily seen as the others, and it is important to bear this in mind, as the shoal occupies a prominent position, bordering as it does on the deep water of Banguey South channel.

Lat.  $7^{\circ} 51' N.$   
Long.  $117^{\circ} 29' E.$

**The Straggler**, a small coral islet, with trees 20 feet high, is a useful object for assisting in the navigation of the eastern part of Banguey South channel. From it the outer extreme of the 7-feet reef just described lies N.W. by W.  $\frac{1}{2}$  W., distant nearly  $1\frac{1}{2}$  miles, while south-westward of the islet are many other dangers. The reef surrounding the islet extends  $1\frac{1}{4}$  miles in an easterly direction, and more than half a mile south-westward. About  $1\frac{1}{2}$  miles S.E. from the east extreme of Straggler reef and E. by S.  $\frac{1}{2}$  S. from the islet, is the outer edge of a reef having in some places less than 6 feet water; half a mile eastward of it is a  $3\frac{1}{4}$ -fathoms coral patch. Other dangers of the group extend 7 miles further to the southward.

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Chart, 948 [2,601].  
Lat.  $7^{\circ} 5' N.$   
Long.  $117^{\circ} 30' E.$   
Var.  $2^{\circ} E.$

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Having passed those islands, bring the peak of Patanunam to bear W.  $\frac{2}{3}$  S., and steer E.  $\frac{2}{3}$  N. through the fairway between the South channel dangers and the rock off the south end of Pagassan, until the sand cay off the north side of Mallawallé island is abeam, distant about a mile; when an E. by S.  $\frac{1}{2}$  S. course will lead clear of the dangers off the northern side of Mallawallé. When the sand cay off the east extreme of that island bears South, distant  $2\frac{1}{4}$  miles, steer E.N.E., which course being preserved will lead one mile northward of Fairway shoal, into the Sulu sea, avoiding Maeander patch, &c., for which see Eastern Archipelago, Part I. Bearings of Straggler island will check the position of the vessel whilst westward of Fairway shoal.

**Mallawallé channel.**—Balábac Main channel is recommended in preference to Mallawallé channel. For Directions through Mallawallé channel, see Eastern Archipelago, Part I.

Lat.  $7^{\circ} 1' N.$   
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**BALÁBAC STRAIT.—General remarks.**—Balábac strait, leading from the China sea into the Mindoro or Sulu sea, lies between Balambángan and Banguey islands on the south, and Balábac island on the north. The greater part of this strait is occupied by coral

Chart. 948 [2,601]. dangers, far too numerous to admit of detailed description. These dangers are divided into groups, each group being distinguished by a special denomination—such as Mangsi danger bank, Great danger bank, &c. This arrangement distinctly defines the limits of the various channels, of which there are eight, between the dangers.

Balambágan and Banguey having been previously described, we will now proceed to describe Balábac island, the high peak of which is the most conspicuous object in the vicinity of the strait, and is visible from all parts of it. Banguey and Balábac peaks lie N.  $\frac{1}{2}$  W. and S.  $\frac{1}{2}$  E. from each other, 37½ miles apart, and as most of the dangers and channels are to the eastward of that line, these peaks are of the first importance for determining the position of vessels when navigating this strait.

**Tidal streams.**—The flood stream sets to the eastward and the ebb to the westward. The strength of the stream or of the current depends greatly on the prevailing winds. The greatest velocity observed was  $2\frac{1}{2}$  knots. See also page 218.

Lat.  $7^{\circ} 26' N.$   
Long.  $117^{\circ} 12' E.$

The **MAIN CHANNEL** through Balábac strait is limited to the southward by the danger line encompassing the reefs and shoals lying off the north and north-east coasts of Banguey, and to the northward by Mangsi Great reef, the southern part of which is  $1\frac{1}{2}$  miles distant from the edge of the bank on the Banguey side. The depths in the channel are not regular, varying from 14 to 23 fathoms, the deepest water being rather nearer the reef than the middle of the channel.

This channel is now generally used by vessels proceeding to Sandakan, &c., the route by the Mallawallé channels being practically abandoned on account of the numerous charted and uncharted dangers existing in it. (H.M.S. *Rainbow*, 1897.)

**Dangers on Southern shore.**—Between Samarang point (page 196) and the north point of Banguey the coast recedes, forming two bays, each having a small stream running into it: the points and the sides of the western bay are fringed with coral extending one to 2 cables from the shore, but the head of it is a coral and sand beach; vessels may anchor in the entrance of the bay in a depth of 4 fathoms. The eastern bay, with the exception of a narrow boat passage, is blocked with coral, upon the outer part of which is a small islet. The limits of the dangers, and the greater part of the reefs and shoals in the vicinity of Balábac strait, are depicted on the chart by a pecked line, within which vessels should not pass. The principal islands and dangers bordering the south side of the Main channel, and fronting the north and east coast of Banguey, are as follows:—

Lat.  $7^{\circ} 22' N.$   
Long.  $117^{\circ} 14' E.$

**North Guhuán islet** is situated on a reef three-quarters of a mile in extent, nearly one mile off the north side of Banguey, and 5 miles

eastward of Saunarang point; there are no off-shore dangers westward of it. Chart, 948 [2,601].  
Var. 2° E.  
From North Guhuan a bank with less than 3 fathoms extends eastward parallel to the shore for about 4 miles, on which are two sand cays and reefs dry at low water.

**Louisa shoal**, composed of coral, with  $1\frac{1}{2}$  fathoms water, is three-quarters of a mile in length; from its north extreme North Guhuan bears S. by W.  $\frac{1}{4}$  W., distant  $1\frac{1}{2}$  miles. Manyangit point, well open of Samarang point, bearing S.W.  $\frac{1}{4}$  W., leads northward of it.

Patches of 5 and  $5\frac{1}{2}$  fathoms are charted as lying  $1\frac{1}{4}$  miles northward of Louisa shoal, and one-third of a mile within the pecked line.

**Maggie reef**, situated about 3 miles eastward of Louisa shoal, is about one mile in length, with a coral patch  $2\frac{1}{2}$  cables in extent on its northern side and many rocks just below water. The reef, which dries, lies with the western sand cay between it and the coast bearing S.S.W., distant 2 miles.

**Black Watch rock**, on which the British barque *Black Watch* Lat.  $7^{\circ} 27\frac{1}{4}'$  N.  
Long.  $117^{\circ} 17\frac{1}{4}'$  E. is reported to have struck, in 1878, lies just within the danger line depicted on the chart, 2 miles north of Maggie reef.

From the position of this rock, as given by the master of the *Black Watch*, North Mangsi island is well open westward of South Mangsi island, bearing N.  $\frac{3}{4}$  E., and the cay on Banguey Outer north-east reefs, S.E.  $\frac{1}{4}$  E.

Several patches, with from  $3\frac{1}{2}$  to 5 fathoms, lie between Black Watch rock and Louisa shoal.

From the irregularity of the soundings near this suspected locality it is possible that other coral heads may exist other than those shown on the chart.

**East Guhuan islet**, about a quarter of a mile in extent, stands on the west side of a coral reef,  $1\frac{1}{2}$  miles in length, the northern part of which dries. About a mile N.N.W. of East Guhuan islet lies a  $1\frac{1}{2}$ -fathoms patch.

**Banguey Outer N.E. reefs** are a cluster of reefs separated from Maggie reef and East Guhuan islet by a channel, one mile wide, with depths of 7 to 10 fathoms; these reefs are  $3\frac{1}{2}$  miles in length in a north-west and south-east direction, a little over a mile in breadth, with a large central portion dry at low water. Upon the north-west extreme of the reefs is a sand cay,\* which is useful for pointing out the locality of these dangers, which lie 6 miles from the shore; close to the edges of these reefs there are depths of 6 to 9 fathoms.

North hill, bearing southward of S.W. by W.  $\frac{1}{4}$  W., leads northward, and the west extreme of North Mangsi island in line with the west extreme of South Mangsi, N.W.  $\frac{3}{4}$  N., or westward of that bearing, leads eastward of these reefs.

Chart, 948 [2,601]. dangers, far too numerous to admit of detailed description. These dangers are divided into groups, each group being distinguished by a special denomination—such as Mangsi danger bank, Great danger bank, &c. This arrangement distinctly defines the limits of the various channels, of which there are eight, between the dangers.

Balambágan and Banguey having been previously described, we will now proceed to describe Balábac island, the high peak of which is the most conspicuous object in the vicinity of the strait, and is visible from all parts of it. Banguey and Balábac peaks lie N.  $\frac{1}{2}$  W. and S.  $\frac{1}{2}$  E. from each other, 37½ miles apart, and as most of the dangers and channels are to the eastward of that line, these peaks are of the first importance for determining the position of vessels when navigating this strait.

**Tidal streams.**—The flood stream sets to the eastward and the ebb to the westward. The strength of the stream or of the current depends greatly on the prevailing winds. The greatest velocity observed was 2½ knots. See also page 218.

**The MAIN CHANNEL** through Balábac strait is limited to the southward by the danger line encompassing the reefs and shoals lying off the north and north-east coasts of Banguey, and to the northward by Mangsi Great reef, the southern part of which is 1½ miles distant from the edge of the bank on the Banguey side. The depths in the channel are not regular, varying from 14 to 23 fathoms, the deepest water being rather nearer the reef than the middle of the channel.

This channel is now generally used by vessels proceeding to Sandakan, &c., the route by the Mallawallé channels being practically abandoned on account of the numerous charted and uncharted dangers existing in it. (H.M.S. *Rainbow*, 1897.)

**Dangers on Southern shore.**—Between Samarang point (page 196) and the north point of Banguey the coast recedes, forming two bays, each having a small stream running into it: the points and the sides of the western bay are fringed with coral extending one to 2 cables from the shore, but the head of it is a coral and sand beach; vessels may anchor in the entrance of the bay in a depth of 4 fathoms. The eastern bay, with the exception of a narrow boat passage, is blocked with coral, upon the outer part of which is a small islet. The limits of the dangers, and the greater part of the reefs and shoals in the vicinity of Balábac strait, are depicted on the chart by a pecked line, within which vessels should not pass. The principal islands and dangers bordering the south side of the Main channel, and fronting the north and east coast of Banguey, are as follows:—

**North Guhuau islet** is situated on a reef three-quarters of a mile in extent, nearly one mile off the north side of Banguey, and 5 miles

eastward of Samarang point; there are no off-shore dangers westward of it. Chart, 948 [2,601]. Var. 2° E.  
From North Guhuan a bank with less than 3 fathoms extends eastward parallel to the shore for about 4 miles, on which are two sand cays and reefs dry at low water.

**Louisa shoal**, composed of coral, with  $1\frac{1}{2}$  fathoms water, is three-quarters of a mile in length; from its north extreme North Guhuan bears S. by W.  $\frac{1}{4}$  W., distant  $1\frac{1}{2}$  miles. Manyangit point, well open of Samarang point, bearing S.W.  $\frac{1}{4}$  W., leads northward of it.

Patches of 5 and  $5\frac{1}{2}$  fathoms are charted as lying  $1\frac{1}{4}$  miles northward of Louisa shoal, and one-third of a mile within the pecked line.

**Maggie reef**, situated about 3 miles eastward of Louisa shoal, is about one mile in length, with a coral patch  $2\frac{1}{2}$  cables in extent on its northern side and many rocks just below water. The reef, which dries, lies with the western sand cay between it and the coast bearing S.S.W., distant 2 miles. -

**Black Watch rock**, on which the British barque *Black Watch* Lat.  $7^{\circ} 27' N.$   
Long.  $117^{\circ} 17' E.$  is reported to have struck, in 1878, lies just within the danger line depicted on the chart, 2 miles north of Maggie reef.

From the position of this rock, as given by the master of the *Black Watch*, North Mangsi island is well open westward of South Mangsi island, bearing N.  $\frac{3}{4}$  E., and the cay on Banguey Outer north-east reefs, S.E.  $\frac{3}{4}$  E.

Several patches, with from  $3\frac{1}{2}$  to 5 fathoms, lie between Black Watch rock and Louisa shoal.

From the irregularity of the soundings near this suspected locality it is possible that other coral heads may exist other than those shown on the chart.

**East Guhuan islet**, about a quarter of a mile in extent, stands on the west side of a coral reef,  $1\frac{1}{2}$  miles in length, the northern part of which dries. About a mile N.N.W. of East Guhuan islet lies a  $1\frac{1}{2}$ -fathoms patch.

**Banguey Outer N.E. reefs** are a cluster of reefs separated from Maggie reef and East Guhuan islet by a channel, one mile wide, with depths of 7 to 10 fathoms; these reefs are  $3\frac{1}{2}$  miles in length in a north-west and south-east direction, a little over a mile in breadth, with a large central portion dry at low water. Upon the north-west extreme of the reefs is a sand cay,\* which is useful for pointing out the locality of these dangers, which lie 6 miles from the shore; close to the edges of these reefs there are depths of 6 to 9 fathoms. \*Lat.  $7^{\circ} 24' N.$   
Long.  $117^{\circ} 20' E.$

North hill, bearing southward of S.W. by W.  $\frac{1}{4}$  W., leads northward, and the west extreme of North Mangsi island in line with the west extreme of South Mangsi, N.W.  $\frac{3}{4}$  N., or westward of that bearing, leads eastward of these reefs.

Chart, 948 [2,601]. Var.  $2^{\circ}$  E. **Coral patches.**—Several coral patches, with depths over them of from 2 to 6 fathoms, lie from 10 to 14 miles eastward and east-south-eastward of Banguey Outer N.E. reefs; this neighbourhood has not been completely examined.

**Banguey East coast.**—The east coast of Banguey is fronted by dangers which extend off several miles; they consist for the most part of extensive reefs, dry at low water, separated from each other by narrow channels.

**Kahamkamman** is a small islet, 2 miles south-eastward of East Guhuan, on the north-west end of a coral reef about a mile in extent; the part surrounding the islet dries at low water.

Westward of this islet is a reef, about  $2\frac{1}{2}$  miles in extent, having three islets, a sand cay, and several patches of reef dry at low water, upon it; Balundangan is the name of the south-westernmost and smallest islet. At one mile south-westward of Balundangan and 3 cables within the edge of the reef fronting the Banguey shore is an island about  $1\frac{1}{4}$  miles in length, with the summit near its centre; this island lies rather more than half a mile off the coast, which is covered with mangrove.

Lat.  $7^{\circ} 20' N.$   
Long.  $117^{\circ} 24' E.$

**Samson patches**, three in number, have depths of  $3\frac{1}{2}$  to 4 fathoms on them; they lie eastward of Kahamkamman near the edge of the danger line marked on the chart; from the eastern patch, Kahamkamman bears W.  $\frac{1}{4}$  N., and is distant 3 miles.

A small  $4\frac{1}{4}$ -fathoms coral patch lies 2 miles S.E.  $\frac{3}{4}$  E. from the eastern Samson patch.

**May Williams shoal**, situated from  $1\frac{1}{2}$  to 2 miles S.E. by S. from Kahamkamman island, is one mile in length with a least depth of 2 fathoms, and is steep-to at a short distance.

**Latoan island**, lying about  $4\frac{1}{2}$  miles southward of Kahamkamman island, is an oval-shaped island, one mile in extent, the tree upon it rising to an apex near the centre. It is situated at the south-west part of a dry reef, which extends  $2\frac{1}{2}$  miles eastward, and  $1\frac{1}{2}$  miles northward of it. A large reef lies to the westward of Latoan, upon which trees are growing.

Outer Latoan patch is the easternmost of three isolated patches which lie off the north-east edge of Latoan island reef; it has a rock a few feet under water, near its eastern edge, from which Latoan apex bears S.W. by W.  $\frac{1}{2}$  W., and is distant  $3\frac{3}{4}$  miles.

Lat.  $7^{\circ} 14' N.$   
Long.  $117^{\circ} 24' E.$

East Banguey patches are two coral patches with 2 and  $2\frac{3}{4}$  fathoms lying three-quarters of a mile and one mile respectively, off the Bankawan reefs; from the outer one, Latoan summit bears W.N.W., distant  $3\frac{3}{4}$  miles.

**Bankawan island**, situated about a mile from the east coast of Banguey, is an irregular shaped flat island,  $2\frac{1}{4}$  miles in length, and  $1\frac{3}{4}$  miles in breadth. Close to its east side is an island, with an islet off its north-east point, and a little more than a mile south-eastward of it, a

round island from which a tongue of sand projects three-quarters of a mile in a south-easterly direction. From the south point of Bankawan numerous small reefs extend for about two miles, which with the reef extending half a mile south-eastward of the tongue of sand, form the northern limits of Bankawan channel.

Boats only can pass between the various reefs comprising the Bankawan and Latoan island groups, but between them and the reef fronting the Banguey coast there is a deep water channel through which it is possible for small vessels to pass, although near the west point of Bankawan the channel is narrowed to little more than a cable by a small reef in the middle.

The space eastward of the reefs herein mentioned has not been completely examined, so that shallow patches not charted may exist.

#### Dangers on northern shore of Main channel.—

**Mangsi Great reef**, the southern edge\* of which is situated  $4\frac{1}{2}$  miles northward of North Guhuan island, is 5 miles in length in an east and west direction by  $2\frac{3}{4}$  miles in breadth, and steep-to on its southern side. It is nearly everywhere covered at high water, but a sand cay upon the eastern part is generally visible from aloft when near the edge. At low water the reef presents a vast expanse of coral and sand, with lagoons here and there.

From the west end of the reef, shallow water, under 10 fathoms, extends about 2 miles in a W.S.W. direction, with irregular depths; the least known is 4 fathoms, but the locality should be avoided. Banguey peak bearing westward of S.S.W. leads westward of it.

**Kestrel rock**.—H.M.S *Kestrel* passed over a patch with 5 fathoms water, in the eastern part of Main channel, with Banguey peak bearing S.W. by W.  $\frac{1}{4}$  W., and the west extreme of South Mangsi island N.W. by W.  $\frac{3}{4}$  W.

Soundings of 8 fathoms were obtained by H.M.S. *Comus*, 1882, on a shoal about one mile south of Kestrel rock; caution should be exercised when in this neighbourhood.

**DIRECTIONS for Main channel**.—Vessels coming from the south-westward, and bound through Balábac strait, during the north-east monsoon, will find Main channel the most convenient. When approaching the north end of Balambángan island, do not bring Buttun point to the westward of S.W.  $\frac{1}{2}$  S., nor come into less than 14 fathoms, until the north hill on Banguey bears E. by S.  $\frac{1}{2}$  S.; which latter mark leads one mile outside the dangers off Siagut point, and of those extending north of Tiga islet. The light green colour of the water over Great Mangsi reef will, even at high tide, enable a good look-out aloft to make out the edge sufficiently far off to permit of a vessel being guided past it at a safe distance. From about three-quarters of a mile off its south end, steer

\*Lat.  $7^{\circ} 27' N.$   
Long.  $117^{\circ} 14' E.$

Chart. 948 [2,601]. to pass about 2 miles southward of South Mangsi island, and the same Var. 2° E. distance northward of Kestrel rock. Thence the course may be altered to East, or as necessary according to destination. North hill will be found useful for bearings. This is the route generally adopted by vessels proceeding to Sandakan, the Mallawallé channels being much encumbered with shoals. See Eastern Archipelago, Part I.

If proceeding to Sandakan, after passing the space with irregular soundings extending eastward from Banguey island to the distance of about 30 miles, steer towards the Muligi islands so as to make them on a S.E. bearing.

Coming from the Sulu sea, the Mangsi islands should be made bearing about West, thence steer to pass 2 miles southward of them; when the islands are abeam a course about W.S.W. will lead to the entrance of Main channel.

**MANGSI DANGER BANK**, situated about  $1\frac{1}{4}$  miles north-eastward of Mangsi Great reef, includes within its limits the Mangsi and Salingsingan islands, with the extensive dangers adjacent; also Loxdale, Jessie, and many smaller shoals. This bank is 10 miles in length in an E. by S. and W. by N. direction, and 4 miles in breadth at the eastern end, tapering to the opposite extreme.

**South Mangsi island**, covered with trees, is round shaped, about half a mile in diameter, and stands upon a reef which extends from it one mile eastward, 6 cables westward, and to a less distance in other directions.

Lat.  $7^{\circ} 31\frac{1}{2}'$  N.  
Long.  $117^{\circ} 18\frac{1}{2}'$  E.

**North Mangsi island**, situated half a mile north-westward of South Mangsi, is covered with trees, which rise to an apex near the centre 130 feet above high water. The island is three-quarters of a mile in length, and from its east end reefs and shoals extend—beyond those projecting from South Mangsi—for a distance of  $2\frac{1}{2}$  miles, and some patches of 4 to 7 fathoms half a mile farther in an easterly direction: from the west end a line of reefs extends in a W. by N.  $\frac{3}{4}$  N. direction to the distance of  $3\frac{1}{2}$  miles.

Lat.  $7^{\circ} 32'$  N.  
Long.  $117^{\circ} 21\frac{1}{2}'$  E.

**Jessie shoal**, with 6 feet least water, lying 3 miles E. by N. from North Mangsi island, is  $1\frac{1}{2}$  miles in length and half a mile in breadth. This danger is situated at the east part of the bank, and shallow patches outline its extremes.

**Salingsingan island**, 2 miles northward of North Mangsi, is composed of coral and sand covered with trees; it is rather more than half a mile in length and one cable in breadth. Shoals, nearly awash in parts, stretch off three-quarters of a mile eastward, and  $1\frac{1}{4}$  miles westward, from the island, the breadth of the latter being nearly a mile.

\*Lat.  $7^{\circ} 34\frac{1}{2}'$  N.  
Long.  $117^{\circ} 13'$  E.

**Loxdale shoal**, at the west end\* of the bank, lies  $1\frac{1}{4}$  miles westward of the dangers extending from North Mangsi and Salingsingan, with deep

water between. It is formed of coral, nearly  $1\frac{3}{4}$  miles in length, and from 3 to 5 cables in breadth, with  $2\frac{1}{2}$  to 3 fathoms water, and fairly steep-to. From the west end of this danger Banguey peak bears S. by W.  $\frac{1}{8}$  W., and Salingsingan E.  $\frac{1}{4}$  S.

Chart. 948 [2,601].

Var.  $2^{\circ}$  E.

**MANGSI CHANNEL**, separating Mangsi Great reef from Lat.  $7^{\circ} 31' N.$  Long.  $117^{\circ} 16\frac{1}{4}' E.$  Mangsi Danger bank, is one mile wide at its narrowest part, where the depths are irregular; it is deep throughout, having from 18 to 33 fathoms in the fairway. The reefs on the north side are steep-to; Mangsi Great reef forming the south side is less so, and from the northern side of the east point of the reef, shoal water extends in the direction of South Mangsi island to the distance of half a mile.

**Directions.**—Navigators will rarely have occasion to use this channel, but in case of necessity the following directions may be of assistance; with a proper look-out, no difficulty will be found in passing safely through. Coming from the westward, and having sighted the Mangsi islands, bring the centre of South Mangsi island to bear E. by S. and steer for it; when the west end of North Mangsi bears E.N.E. steer S.E., passing midway between South Mangsi and Great reef.

**GREAT DANGER BANK** comprises many reefs, amongst which no vessel should venture. It is 14 miles in length in a W.N.W. and E.S.E. direction, and 8 miles in breadth at its north-west end, gradually decreasing towards its south-east extreme. On the south-east reef is a sand cay.

**S.E. shoals** comprise several coral patches situated near the south-east extreme of the bank, extending over a space about 2 miles in length with depths of  $1\frac{3}{4}$  to 4 fathoms, the shallowest being E.  $\frac{3}{4}$  S., distant 3 miles from the sand cay.

**Sand cay**, the only conspicuous object marking any part of the bank, stands at the southern side of it, about 4 miles westward of the south-east extreme. This cay is situated near the centre of a narrow coral reef, 3 miles in length, from each end of which shallow water (under 3 fathoms) extends about half a mile, with patches of 3 to 5 fathoms beyond, and in a northerly direction also, nearly as far as the Middle shoals.

**Middle shoals** are a cluster of coral patches forming the middle of Great Danger bank; they cover a space of about 4 miles, with as little as 2 fathoms in two or more places.

**North patches**, two in number, lie near the north edge of the bank, with  $3\frac{1}{2}$  fathoms least water.

**N.W. shoals**, situated at the north-west extreme of the bank, occupy Lat.  $7^{\circ} 41' N.$  Long.  $117^{\circ} 14\frac{1}{4}' E.$  a space  $4\frac{1}{2}$  miles in length, with depths of  $1\frac{1}{2}$  to 3 fathoms.

General chart, 967 [2,650].

E 32369.

O

Chart. 948 [2,601].  
 Lat.  $7^{\circ} 35' N.$   
 Long.  $117^{\circ} 18' E.$   
 Var.  $2^{\circ} E.$

**MIDDLE CHANNEL**, separating Mangsi\* Danger bank from Great Danger bank, is a mile wide at its narrowest part, with depths of 16 to 33 fathoms in the fairway.

**Ray bank**, of sand and coral, is a mile in length, half a mile in breadth, and steep-to, with a least known depth of 4 fathoms near its centre; it lies on the north side of the approach to Middle channel, and 6 miles westward of the north-west shoals on Great Danger bank, with Balábac peak bearing N. by W.  $\frac{3}{4}$  W., distant 16 miles from its western extreme.

**Directions.**—Middle channel lies out of the ordinary route of vessels, but it may be used if necessary. Coming from the south-westward, Balábac peak should not be brought westward of N.N.W. until Salingsingan island bears E. by S.  $\frac{1}{2}$  S. to clear Loxdale shoal. Steer for Salingsingan island, bearing E.S.E. until about 5 miles from it, when an E. by S. course will lead a mile northward of that island and about  $1\frac{1}{2}$  miles southward of the sand cay on Great Danger bank. Bearings of the Mangsi island and of the sand cay will keep a vessel in the fairway.

**SIMANÁHAN REEF and CHANNEL.**—Simanáhan reef, about  $1\frac{1}{2}$  miles northward of North patches on Great Danger bank, is situated near the centre of a coral bank 5 miles in length by three-quarters of a mile in breadth. The reef, dry at low water to the extent of about  $1\frac{1}{2}$  miles, has a sand bank near its centre which is just below the surface at high water; this serves, even when covered, from the light colour of the water over it, to point out the position of the reef from some distance. The shallow part of the bank, under a depth of 3 fathoms, encompassing the reef, is about 3 miles in extent; from the centre of the bank the east extreme of Lumbukan bears N.W.  $\frac{1}{2}$  W., distant  $7\frac{1}{2}$  miles.

Lat.  $7^{\circ} 44' N.$   
 Long.  $117^{\circ} 10\frac{1}{2}' E.$

**Ellis shoal**, situated 3 miles north-eastward of Ray bank, and in the western approach to Simanáhan and Lumbukan channels; is composed of coral,  $2\frac{1}{2}$  miles in length and half a mile in breadth; it has a least depth of  $2\frac{3}{4}$  fathoms near its centre, from which Balábac peak bears N.N.W.  $\frac{1}{8}$  W., distant 14 miles.

Lat.  $7^{\circ} 44' N.$   
 Long.  $117^{\circ} 20' E.$

**The Channel** between Great Danger bank and Simanáhan reef is apparently free from danger with depths of 23 to 30 fathoms: all that is necessary for its safe navigation is to pass about three-quarters of a mile to the southward of the reef on an East or West course, avoiding Ellis shoal, but occasion can seldom arise to render this a convenient channel to proceed by.

**LUMBUKAN ISLAND and CHANNEL.**—Lumbukan channel, lying between Ellis shoal and Simanáhan reef on the south, and

Lumbukan island and bank on the north, is from 4 to 5 miles wide, with depths of 13 to 25 fathoms, and apparently free from danger.

Chart. 948 [2,601]  
Var. 2° N.

A bank about three-quarters of a mile in length east and west, and with depths of  $7\frac{1}{2}$  to 10 fathoms over it, is situated to the southward of Lumbukan inland, from the centre of which the eastern extreme of Lumbukan bears N.  $22^{\circ}$  E. distant 3 miles, and cape Melville N.  $83^{\circ}$  W. Doorly patches divide the channel at its eastern end, but the least known depth over them is 6 fathoms, and they are steep-to.

**Lumbukan island**, about 100 feet high, is about three-quarters of a mile in length and wooded; it is surrounded by a reef, and shallow water under a depth of 3 fathoms extends  $1\frac{1}{2}$  miles south-westward, and over a mile north-eastward and eastward from it. At 2 to  $3\frac{1}{2}$  miles north-eastward of the island, on the same bank, are the North-east shoals with depths of  $1\frac{1}{2}$  to 3 fathoms. At 2 miles eastward of the island are patches of  $3\frac{1}{2}$  to 5 fathoms, and one mile southward is a shoal with  $1\frac{1}{2}$  to 3 fathoms, known as South shoal. The island and the dangers all stand on Lumbukan Danger bank.

Lat.  $7^{\circ} 50' N.$   
Long.  $117^{\circ} 13' E.$

**Directions.**—If bound to the north-eastward, Lumbukan is a good channel to use, on account of its width, and to ensure its safe navigation, it will be only necessary to pass about  $3\frac{1}{2}$  miles southward of Lumbukan island; bearings of cape Melville lighthouse, Balábac peak and Lumbukan will afford the means of fixing the vessel's position.

**KOMIRAN ISLAND and CHANNEL.**—Komiran Danger bank,  $2\frac{1}{2}$  miles in length, E.N.E. and W.S.W., and a mile in breadth, includes within its limits Komiran island and two shoals.

**Komiran island**, 80 feet high, situated North 5 miles from Lumbukan island, is small, wooded, and surrounded by a reef extending from one to 2 cables from the shore. Turtle at times resort here in great numbers.

Lat.  $7^{\circ} 55' N.$   
Long.  $117^{\circ} 34' E.$

**Shoals.**—A shoal, nearly half a mile in extent, with 2 to 3 fathoms water, lies south-westward of Komiran, its outer edge being distant nearly  $1\frac{1}{2}$  miles; and another shoal, about the same size, having  $2\frac{3}{4}$  to 3 fathoms, lies a little farther in an easterly direction; both are fairly steep-to. A bank, about a mile in extent, with general depths of 6 to 8 fathoms and a patch of  $4\frac{1}{2}$  fathoms on its south side, lies midway between Komiran island and the east end of Lumbukan island; there is also a small patch of 6 fathoms in the channel north-eastward of it.

**Komiran channel** is  $3\frac{1}{2}$  miles wide between the dangers surrounding Lumbukan and Komiran Danger bank, with depths of 15 to 25 fathoms in the fairway on either side of the bank mentioned above. It is not recommended, as there are other and better channels, though there

Chart, 948 [2,601]. seems no difficulty in navigating it. Cape Melville lighthouse bearing Var. 2° E. W. by S.  $\frac{3}{4}$  S. apparently leads through.

Lat. 7° 58' N.  
Long. 117° 13' E.

**NASUBATTA CHANNEL** is  $4\frac{1}{2}$  miles wide between Komiran Danger bank and Roughton reef, with depths of above 100 fathoms in the fairway. It is only necessary when navigating this channel to guard against the effects of the tidal stream which, when combined with the current, sweeps through it in the direction of North Balábac strait with considerable velocity at times.

**Nasubatta island and reef.**—Nasubatta island, on the north side of the channel, is a low cleft rock of sandstone formation, covered with trees, the tops of which are elevated 90 feet above the sea. It lies from 2 to 3 cables within the northern edge of a reef, which is 2 miles in length, dry at low water, and steep-to.

\*Lat. 8° 1 $\frac{1}{2}$ ' N.  
Long. 117° 13' E.

**Roughton reef** lies to the eastward of Nasubatta reef, separated by a channel  $1\frac{1}{2}$  miles in breadth with depths above 100 fathoms near the centre; the reef is  $2\frac{1}{2}$  miles in length in a north-east and south-westerly direction by about a mile in breadth. On the north-west side is a sand cay, covered with bushes,\* with Balábac peak bearing S.W. by W.  $\frac{1}{4}$  W., distant nearly 11 miles. The reef is steep-to, except on its north-east side, where shallow water extends from 2 to 3 cables, and three-quarters of a mile northward of the east point is a patch of  $2\frac{1}{2}$  fathoms.

\*Lat. 7° 56' N.  
Long. 117° 3 $\frac{1}{2}$ ' E.

**BALÁBAC ISLAND.—General remarks.—Aspect.**—Balábac, lying off the south-west extremity of Paláwan island and about 26 miles northward of Balambángan, is nearly 17 miles in length, north and south, and 9 miles in breadth. On the southern half of the island are several ranges of high hills exhibiting great variety of outline; only a few, however, are of sufficient importance to require description. Steepfall range, about 2 miles from cape Melville, the south point of the island, is composed of several hills in a semicircular form, and being nearly of the same elevation throughout, 850 feet, present a table-topped appearance, whence the sides fall in a precipitous manner; hence the name. Northward of Steepfall, other ranges varying in height from 1,200 to 1,300 feet, extend to Daláwan bay; Balábac peak, situated 2 miles north-westward of Daláwan bay, has the greatest elevation on the island, 1,890 feet.\* To the northward other ranges extend as far as Kalandórang bay. On the northern part of the island are several detached hills, the highest being elevated 750 feet. See the settlement, page 215.

**WEST COAST.—Dangers.**—The west coast of Balábac is fronted by numerous reefs which extend several miles off. The most important are, Gnat reef, Balábac Great reefs, and Ada reef, which dry and extend from 2 to 4 miles off shore, whilst seaward of them are the

South-western banks and the Western shoals, with depths of 2 to 4 fathoms and possibly less, from 4 to  $6\frac{1}{2}$  miles off shore. The chart will afford better information than a written description.

Chart, 948 [2,601]  
Var. 2° E.

**Cape Melville**, the south extreme of Balábac, is fronted by a reef to the distance of half a mile, and with the point to the westward has detached patches extending off to the distance of  $1\frac{1}{2}$  miles.

Lat.  $7^{\circ} 49' N.$   
Long.  $117^{\circ} 0' E.$

**LIGHT.**—From a white octagonal masonry tower 90 feet in height, with dwelling attached, situated  $1\frac{1}{2}$  miles north-westward of cape Melville, is exhibited, at an elevation of 297 feet above high water, a *flashing white* light with a period of *twenty seconds*, visible when bearing from S.  $32^{\circ}$  E., through east and north, to S.  $63^{\circ}$  W., from a distance of 24 miles in clear weather.

**Directions.**—When standing towards the dangers off-lying the west coast of Balábac in the afternoon, when the sun will be astern, the outer shoals, and also the reefs will generally be seen in sufficient time to avoid them; but if the sun be ahead, the outer shoals are difficult to make out until close to them. The soundings are so variable and uncertain under depths of 30 fathoms, as to afford little assistance. A good look-out is therefore of the first importance. At night, the soundings, coupled with bearings of the light, must be carefully attended to if near these dangers, and vessels should not approach to a less depth than 40 fathoms off the south-west and west parts of the island, nor get within 50 fathoms off the north-west part.

**Inshore channel.**—There is said to be a channel between Balábac Great reef and the island, a cable wide in its narrowest part and with not less than  $4\frac{1}{2}$  fathoms. There are many isolated dangers in it, and apparently no reason for any stranger attempting it.

West point shows out distinctly when viewed from the north-west and south-westward, and is useful for bearings when nearing the shoals.

**Port Ciego**, or Blind harbour, lies in the opening nearly 2 miles wide, between Balábac and Ramos islands. It is, however, blocked with coral, except near the points at the entrance, where there is a narrow channel between the reefs, with 9 and 10 fathoms water. Its eastern entrance is Kandaráman inlet, which separates Balábac and Ramos islands, almost blocked by reefs. We have no information other than the chart shows.

Lat.  $8^{\circ} 4' N.$   
Long.  $117^{\circ} 0' E.$

From port Ciego to cape Disaster, the north extreme of Ramos island, and round eastward, the coast is low, with two small cliffy hills a little inland. The coast reef dries nearly a mile off at low water.

**North-west shoal** lies from 2 to  $3\frac{1}{2}$  miles westward of Ramos island, and has as little as  $1\frac{1}{2}$  fathoms over it in places.

Charts 948 [2,601],  
966 [2,603].  
Var. 3° E.

Lat. 7° 49' N.  
Long. 117° 2' E.

**EAST COAST.**—The east coast of Balábac island is tolerably bold, with deep water close to it in most places.

**Clarendon bay**, situated three-quarters of a mile north-east of cape Melville, is nearly one mile in length in a north-westerly direction, and half a mile in breadth, with depths of 4 to 6 fathoms, mud. From the southern entrance point the reef extends off a very short distance, but from the northern entrance point it projects more than two cables, reducing the navigable channel to barely three-quarters of a cable. A red nun buoy marks edge of spit on north-east side entering, and a black can buoy edge of western shore reef,  $3\frac{1}{2}$  cables within West point. A white wooden beacon with top-mark is erected on the reef at head of harbour, which, bearing N.N.W.  $\frac{7}{8}$  W., leads through the fairway up to anchorage abreast the black buoy. Inside the distance of 2 cables from the beacon there are isolated shoal patches, carrying about 9 feet.

Lat. 7° 54' N.  
Long. 117° 8' E.

**Daláwan bay**, situated  $5\frac{1}{4}$  miles north-east of Clarendon bay, is convenient for wooding and watering, and affords good shelter during the south-west monsoon.

Daláwan bay will be readily recognised by the low land extending in a W.N.W. direction from the beach across the island, separating the high land about Balábac peak from Transect hills, a smooth table-topped hill 1,319 feet in height, on the south side of the bay.

The bay is about a mile wide between the entrance points, and about three-fourths of a mile deep, with anchorage in depths of 7 to 12 fathoms, mud, shoaling gradually to the sandy beach at its head. The shores of the bay are densely wooded, the entrance points on either side being fronted with mangrove. The best anchorage is about the centre of the bay in 9 fathoms, mud, nearly half a mile from the beach.

**Reefs**, dry at low water, project from both points at the entrance, contracting the channel to a little less than 7 cables; that on the northern side has a rock at its extremity named Buoy rock, lying South 2 cables from the shore, and which, from being generally uncovered, forms an excellent guide to enter the bay. The spit on the south side dries  $1\frac{1}{2}$  cables from the shore, but a rocky spit extends  $3\frac{1}{2}$  cables beyond this in a N.E. by E. direction, having in some parts only 3 feet water, with 5 and 7 fathoms close to the edge.

A reef of rocks one cable in extent, dry at low water springs, lies 2 cables eastward of the entrance of the river, with 4 fathoms, mud, near its outer edge.

**A stream** is situated in the south-western corner of the bay, northward of the White rock; its channel is constantly shifting in consequence of freshets, but boats can enter near high water.

**Tides.**—It is high water, full and change, at Daláwan bay at 11h. springs rise 5 feet.

**Supplies.**—About a quarter of a mile, north-westward from White rock, is a rivulet of good water; in the dry season the water must be obtained some distance up to be good. It is navigable for boats on ordinary occasions about a mile, where there are a few houses and some cultivated ground where possibly goats, fowls, yams, &c., are obtainable.

**Kalandórang bay**, or Puerto del Principe Alfonso, situated 6 miles northward of Daláwan bay, is about half a mile wide between Sarmiento and Espina points, with depths of 6 to 14 fathoms. It is shallow for nearly a mile from its head and 4 cables seaward of the town, with isolated patches between the 3 and 5 fathoms contour-lines. Off the town are depths of  $1\frac{1}{2}$  to 2 fathoms, according to the distance. The south point of the entrance is formed by a hill 105 feet high, named Almirante Gil; the north point is mangrove, with hills a short distance inside; coral reef with shallow water beyond extends about a cable off both points, and for a greater distance off the points within on the northern shore, which is all mangrove.

**Settlement.**—The Spanish Government erected a military station here, named Balábac, in 1858, on the south shore, for the purpose of developing the trade of Paláwan and other neighbouring islands; it has not succeeded, for there is absolutely no trade whatever.

The population in 1895 amounted to 327, consisting of 12 Spaniards, 278 natives, 24 Chinese, 6 Moors, and 7 half-breeds, under a naval officer who was the Governor. Lieutenant W. B. Fletcher, of the s.s. *Quiros*, U.S. Navy, reported the place to be uninhabited in January 1903.

**Climate.**—The dry season is from November to April, and the wet season from May to October; the average temperature from one year's observations was 79° Fahr.

**LIGHT.**—A *fired white* light is exhibited from a square tower 13 feet high (painted white with red base) on Almirante Gil hill at an elevation of 119 feet above the sea, and visible in clear weather at the distance of about 8 miles; it is not to be relied on.

**Supplies.**—Within Espina point is a coal store and small jetty. Water is procurable at a little stream near the above store, but no other supplies can be depended on. There is a landing pier at the town.

**Tides.**—It is high water, full and change, at Kalandórang bay at 11h.; springs rise 6 feet.

**Directions.—Anchorage.**—A steam vessel will find no difficulty in entering Kalandórang bay, guided by the plan. Approach mid-way between the entrance points, and when the lighthouse bears S.S.E. steer for the bluff westward of the town, bearing S.W.  $\frac{1}{2}$  W., proceeding slowly, as the depths decrease quickly within the 10-fathoms line. Anchor when the lighthouse bears E. by S.  $\frac{1}{2}$  S. in about 8 fathoms. Small vessels can

Charts 948 [2,601], go farther in on the line of bearing of the bluff. The anchorage is good  
966 [2,603].  
Var. 2° E.

with a bottom of mud, and perfectly secure in the south-west monsoon season. In the opposite season the monsoon occasionally blows into the bay with force, raising a nasty chop of a sea, so that vessels should anchor nearer the north shore in that period.

A sailing vessel from the southward should make for Daláwan bay, if the wind be likely to fail, and await a more favourable opportunity for entering Kalandórang bay; for, on account of the deep water, which is unsuitable for anchoring, if the wind should fail when within a mile or so of the port, the vessel would be swept towards the numerous dangers to the northward, there being a current setting in that direction during the south-west monsoon.

Lat. 8° 6' N.  
Long. 117° 6½' E.

**Kandaráman island**, situated on a reef very steep-to, 1½ miles eastward of the north extreme of Balábac island, is low and flat, 1½ miles in length and three-quarters of a mile in breadth; it is separated from Balábac island, and from Kaxisigan island lying off the inlet of Kandaráman, by a channel rather more than half a mile wide, with depths of 30 to 44 fathoms.

A reef extends half a mile northward of Kaxisigan island, and there are patches of 1½ to 3 fathoms for the distance of a mile beyond it.

There is also a patch of 4 fathoms 2 cables S.E. of its south extreme.

**NORTH CHANNEL** is 4½ miles wide between Nasubatta and Kanabungan island reefs, and 5½ miles wide between Roughton reef and the reefs extending 1½ miles from Byan and Gabung islands.

In the fairway there are depths exceeding 100 fathoms in places.

**Caution.**—The only difficulty likely to arise in the navigation of this channel will be caused by the tidal stream when combined with the current which runs with considerable velocity during the strength of the monsoons, requiring a strong favourable breeze to enable sailing vessels to make head-way against it. But no danger is likely to occur from this cause if they keep northward of the deep water, where there is anchorage.

Lat. 8° 5' N.  
Long. 117° 10' E.

**A shoal**, 50 to 80 feet in extent, with 5 fathoms over it, and steep-to, was reported by the master of the German vessel *J. W. Gildemeister*, 1885, to lie with Kanabungan island bearing N.N.W., distant about 2½ miles. The shoal is charted where there are depths of 34 to 93 fathoms around, and in the fairway both of North channel and North Balábac strait.

**NORTH BALÁBAC STRAIT** formed on the south by Balábac and Kandaráman island, and on the north by Bankálan, Mantangule, and Kanabungan islands, is 11 miles in length and about 2 miles in breadth at its narrowest part, abreast Kanabungan island, with from 20 to 50 fathoms water throughout; there is generally a strong stream in the narrow part of the strait depending on the monsoon.

**Sekam** is a low and narrow island about one mile in length, with trees about 100 feet high. It is situated on the west side of the entrance of North Balábac strait, and separated from cape Disaster by Bate channel,  $1\frac{1}{4}$  miles wide, with depths of 25 to 50 fathoms in the fairway, and with deep water close to the reefs surrounding the island; this reef extends  $1\frac{1}{2}$  miles north-westward from the western extreme of the island with patches of coral on it which only cover at high water.

Depths of 4 to 9 fathoms extend about a mile westward and northward of the west end of the reef.

**Bankálan island**, lying 5 miles north-eastward of Sekam, on the east side of the strait, is 3 miles in length by  $1\frac{3}{4}$  miles in breadth. The island is half encircled by a reef usually discernible by the light-green water inside the breakers, and which at the north-western extreme extends nearly  $1\frac{1}{2}$  miles from the shore. The reef projects a mile from the south-western extreme of the island, and there are many isolated patches of one to 3 fathoms in the passage between it and Mantangule.

**Patongong islet**, lying 3 miles north-eastward of Bankálan, is nearly half a mile in length, having a reef extending  $1\frac{1}{4}$  miles to the westward and north-westward.

**Kanimeran**, lying  $1\frac{3}{4}$  miles north-eastward of Patongong, is a small sandy island with trees; a reef extends 8 cables north-westward of this island.

**Mantangule and Kanabungan islands.** — Mantangule island, lying 2 miles south-eastward of Bankálan island, is 4 miles in length, and  $1\frac{1}{2}$  miles in breadth. Kanabungan island, 2 miles south-westward of Mantangule, is  $1\frac{1}{4}$  miles in length, and about a third of a mile in breadth.

The islands stand on the same reef of horseshoe shape which extends over a mile westward of both of them; eastward, between the islands are depths of 4 to 7 fahoms, encumbered with shallow reefs. The east extreme of Kanabungan has a reef extending  $1\frac{1}{2}$  miles.

The edge of the reef on the Kanabungan side of North Balábac strait extends 2 cables from the shore, but to twice that distance on the Kandaráman side; it is well defined by the light-coloured water and a few small rocks which just show at high water on the south side of the channel.

**Malinsono island** is a small and high island situated on the coral spit extending  $1\frac{1}{2}$  miles off the north-east point of Mantangule island. There are many shallow patches eastward of it.

**Appo, Gabung, and Byan** are small islands situated on the northern edge of the reef, 2 miles wide, which extends nearly 6 miles south-westward of Bugsuk island.

Chart, 948 [2,601].  
Lat.  $8^{\circ} 11' N.$   
Long.  $117^{\circ} 1' E.$   
Var.  $2^{\circ} E.$

Chart. 948 [2,601].  
 Var.  $2^{\circ}$  E.  
 Lat.  $8^{\circ} 12' N.$   
 Long.  $117^{\circ} 2' E.$

**Anchorage** tolerably sheltered from south-west winds may be obtained on the north side of Sekam island, in 19 to 20 fathoms water, sand and coral, about three-quarters of a mile from the shore, with the eastern extreme of the island bearing South; the reef to the westward affording protection from the swell.

In bad weather, a second anchor should be let go in time, as the squalls, which often succeed each other rapidly, are sometimes most violent; and, once off the bank in deep water, a sailing vessel would be awkwardly situated as there is no other anchorage for which she could run.

**Tides and Current.**—It is high water at Sekam island, full and change, at 10h. 50m.; rise 5 feet. The flood stream sets to the eastward, and the ebb to the westward; maximum velocity observed,  $2\frac{1}{2}$  knots.

The strength of the current through Balábac strait depends on the prevailing winds. In the months of October and November, after a succession of westerly winds, it was found to set constantly to the eastward, slackening only on the ebb tide; while in July, after a continuance of unusually fine weather with light east and south-east winds, it set with the same velocity, viz., from three-quarters to  $2\frac{1}{2}$  knots in the opposite direction. The mean velocity observed for thirteen consecutive hours was  $1\frac{3}{4}$  knots.

**Directions for North Balábac strait.**—If coming from the southward or westward, do not approach Balábac island nearer than 12 miles until Balábac peak bears to the southward of S.E. by E.  $\frac{1}{4}$  E.; or until Cliff hill\* on Ramos island bears East, when Sekam island may be steered for on an E.N.E. bearing.

If entering by Bate channel, keep a little towards Sekam island, to avoid the edge of the reef which extends about three-fourths of a mile from cape Disaster, but on which the sea generally breaks.

From Sekam island shape course to pass midway between Kandaráman and Kanabungan, the two low islands on either side of the strait. If proceeding to the eastward, pass within  $1\frac{1}{2}$  miles of the south end of Kanabungan; and if bound to the southward, to Kalandórang bay, &c., steer to pass the same distance eastward of Kandaráman, by which means the reported shoal charted from  $2\frac{1}{2}$  to 3 miles from those islands, will be avoided.

If entering northward of Sekam island, steer to pass midway between it and Bankálan island on about a S.E. course, avoiding the reef which stretches north-westward of Sekam, and which is usually visible; thence in the fairway between Kanabungan and Kandaráman islands, as before.

**ISLANDS eastward of Bankálan.**—The islands bordering North Balábac strait have been described. Eastward of these, and southward of the south point of Paláwan are the following:—

\*Lat.  $8^{\circ} 6' N.$   
 Long.  $117^{\circ} 24' E.$

General chart, 967 [2,650].

**Pandannan island**,  $3\frac{1}{2}$  miles north-eastward of Bankálan, is about  $6\frac{1}{2}$  miles in length and about  $2\frac{1}{2}$  miles in breadth. Its southern and western shores are fringed with coral ledges, and off the south-western extreme is a sandbank, dry at low water.\*

Chart, 948 [3,601]  
Var. 2° E.

\*Lat.  $8^{\circ} 15' N.$   
Long.  $117^{\circ} 9' E.$

The island rises a little towards its north end, and its extreme terminates in small abrupt heads, more especially at the north-east point, off which there is a small bushy islet; from the islet a reef extends  $5\frac{1}{2}$  miles in a north-easterly direction, parallel with the coast of Paláwan, having a depth of about 20 fathoms close to its western edge.

There is, also, an islet on the north-west side of the island, from which a reef projects, contracting the channel between it and the south point of Paláwan to three-fourths of a mile, in which there are depths of 7 to 9 fathoms, mud.

**Water.**—Fresh water was found in a small opening on the south side of Pandannan island, about  $1\frac{3}{4}$  miles eastward of the point; but the supply was scanty and difficult to obtain, owing to the reef fronting it.

**Bugsuk island**, 9 miles in length and  $4\frac{1}{2}$  miles in breadth, lies close to the east side of Pandannan, but is separated from it by a channel  $3\frac{1}{2}$  cables wide, in which there are depths of 10 to 18 fathoms. The southern and eastern sides of Bugsuk are fringed by a reef extending in some parts nearly 2 miles from the shore; its edge being steep-to is well defined.

**Bowen** is a round islet off the north point of Bugsuk, having a reef, partly dry at low water, extending  $3\frac{1}{2}$  miles from it in an easterly direction.

Lat.  $8^{\circ} 22' N.$   
Long.  $117^{\circ} 17' E.$

**Anchorage.**—To the eastward of Bankálan, limited on the north and south by Pandannan and Mantangule, and on the east and south-east by Bugsuk, is an expanse of water, 8 miles in length in an east and west, and  $3\frac{1}{2}$  miles in a north and south direction, where in some parts anchorage sheltered from all winds may be found in depths of from 7 to 12 fathoms. The channels into it are, however, intricate, and almost impracticable for sailing vessels, being either close along the edges of the reef, or, where it is wide and inviting, between small detached coral patches, for which it is impossible to give any specific directions.

The best channel, if they admit of a choice, appears to be to the northward of Bankálan; between its reef and that extending from Patongong, it is  $1\frac{1}{2}$  miles wide, but a 3-fathoms coral patch lying in the centre, just within the entrance, contracts it to half that distance. It should only be attempted when the reefs are distinctly visible from aloft.

The following remarks may prove of value, but they must not be absolutely relied on:—

To enter by this channel, sight the edge of Bankálan reef, which is always well defined, and keep along it at half a mile distant, until the

Chart, 948 [2,601]. western extreme of the island bears S. by W.  $\frac{1}{2}$  W., to clear a small Var.  $2^{\circ}$  E. 3-fathoms knoll detached 3 cables from it; then close the reef immediately, to avoid the central patch, and keep 2 to 3 cables off, steering for Patawan islet\* off Bankálan in line with the north extreme of Malinsono. Do not approach Bankálan within 3 cables.

\*Lat.  $8^{\circ}14'N.$   
Long.  $117^{\circ}8'E.$

During the south-west monsoon, anchorage may be obtained between Bankálan and Patawan in 8 or 9 fathoms, sandy bottom, with the latter island bearing about E.S.E. In the north-east monsoon, the best anchorage is to the south-eastward of Patawan, in 9 to 10 fathoms, taking care to pass between it and Bankálan, as the ground to the eastward is foul.

There is a passage in from the northward to the eastward of Kanimeran island, which under some circumstances may be preferable to, and probably be found less intricate than that just described.

Lat.  $8^{\circ}10'N.$   
Long.  $117^{\circ}13'E.$

The only accessible channel from the south-eastward is between Mantangule and Byan island. This channel, through which a strong current usually sets, is three-fourths of a mile wide, and has depths of 11 and 12 fathoms in it, with reefs extending to the southward from either side of the entrance; it has been referred to previously.

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General chart, 967 [2,650].

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## CHAPTER VIII.

### WESTERN PHILIPPINE ISLANDS.

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WEST COAST OF PALÁWAN ISLAND AND PASSAGE. —

DANGEROUS GROUND BETWEEN PALÁWAN PASSAGE  
AND THE MAIN ROUTE.

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**General remarks.**—The island of Paláwan or Paragua, one of Var.  $11^{\circ}$  E. the largest islands of the Philippine archipelago, extends north-east and south-west, between the parallels of  $8^{\circ} 20'$  N. and  $11^{\circ} 25'$  N. It is high, long, and narrow, and forms with its western coast one of the boundaries of the China sea. The published chart of this island is on too small a scale to navigate with safety, and the coast, therefore, should be given a wide berth. The remarks are chiefly from the survey by Captain Bates in H.M.S. *Royalist*, 1850–54.

The island produces wax, nutmegs, camphor, sandal-wood, cocoanuts, canes, and the edible birds' nests, also a variety of timber for building purposes. The interior is little known.

**WEST COAST.**—Cape Buliluyan, the southern point of Lat.  $8^{\circ} 20'$  N.  
Long.  $117^{\circ} 10'$  E. Paláwan island, is a low shelving point fronted by mangroves, having on its south side depths of 4 to 8 fathoms close-to, and on the eastern side,—between it and the north head of Pandannan island, where the channel is 8 cables wide,—from 28 to 30 fathoms. The western side is fronted by a reef, dry at low water, to the distance of 3 to 5 cables, with depths of 6 fathoms, mud, close to the edge.

**Coral patches.**—At 2 miles westward of cape Buliluyan, and the same distance northward of the island of Kanimeran is a coral patch three-quarters of a mile in extent, with about 3 fathoms water and steep-to. North, 3 miles from the above and  $2\frac{1}{2}$  miles from the shore is another patch with the same depth, half a mile in extent, from the centre of which the south extreme of Paláwan, bears S.E.  $\frac{1}{4}$  S.

Off Welcome point,  $3\frac{1}{2}$  miles northward of cape Buliluyan, rocky ground with 2 to 3 fathoms, lies about  $1\frac{1}{2}$  miles from the shore.

**Kapyas**, a small low wooded island, lying 6 miles northward of cape Buliluyan, has a reef extending 4 cables northward of it; the south side of the island is steep-to. Between it and the shore are depths of 6 to 9 fathoms.

Lat.  $8^{\circ} 27' N.$   
Long.  $117^{\circ} 8' E.$   
Var.  $1\frac{1}{4}^{\circ}$  E.

Rocky ground lies  $2\frac{1}{2}$  miles westward of Kapyas, with depths of 2 fathoms only in places, and 25 to 30 fathoms close to the western edge.

At  $1\frac{1}{2}$  miles north of Kapyas island a spit projects from Repose point, having on it a dry sand bank  $1\frac{1}{4}$  miles from the shore. Foul ground extends nearly 2 miles beyond this, with depths of a quarter of a fathom, rock, to  $2\frac{1}{2}$  fathoms in places.

Lat.  $8^{\circ} 34\frac{1}{2}' N.$   
Long.  $117^{\circ} 14' E.$

**Alimudin point**, about 7 miles northward of Repose point, is a wooded promontory, forming the southern extremity of Kanipán bay. The intermediate coast is chiefly mangrove, indented with bays, lined with reefs dry at low water and extending from 3 to 7 cables, having depths of 10 to 12 fathoms water close to their edges.

Rocky patches with from 2 to 5 fathoms lie  $1\frac{1}{2}$  miles north-west of Alimudin point.

**S.W. or Triple hill**.—A low range of hills commencing abreast of Kapyas island, lies parallel with the coast, about  $1\frac{1}{2}$  miles inshore, of which South-west hill, with a small triple summit, 900 feet high, is the highest and most conspicuous. At the northern extremity of this range there is a hill named West Coast hill.

**Shoals**.—The shoals seaward of South Regent, bordering the east side of Paláwan channel, are described on page 240.

Lat.  $8^{\circ} 32' N.$   
Long.  $117^{\circ} 4' E.$

**South Regent shoal**, which appears to be the south-western-most of the inner dangers, is a patch of sand and coral, half a mile in extent, with a depth of  $1\frac{1}{2}$  fathoms, and 13 fathoms close around. It lies with the southern extreme of Paláwan bearing S.S.E.  $\frac{1}{4}$  E., and the summit of Bulanhau in line with Alimudin point.

On the latter line,  $2\frac{1}{2}$  miles inshore of this shoal, there are two other patches, each 3 cables in extent, and 3 cables apart, covered with 2 fathoms water.

**Kamonga shoal**, situated E. by S.  $\frac{1}{4}$  S.,  $3\frac{1}{2}$  miles from South Regent shoal, is a 2-fathoms patch 3 cables in extent. A doubtful danger is charted S.W. by W., about 5 miles from Kamonga shoal.

The depths in the vicinity of these shoals vary from 30 to 35 fathoms, mud, decreasing to 18 and 20 fathoms near the shore, with occasional patches of 4 and 5 fathoms, coral.

**KANIPÁN BAY**.—Cape Siakel,  $2\frac{1}{2}$  miles northward of Alimudin point, is a wooded promontory higher than that of Alimudin, forming the north extremity of Kanipán bay. In the centre of a sandy beach to the southward of this, the Kanipán river discharges. It is navigable for boats for 2 miles, where on some rising ground on the left bank is a Malay village. There is only one foot depth at low water over the reef at the entrance of the river.

The shore of the bay is lined with coral, which in the south-west Var.  $11^{\circ}$  E. corner dries a mile off. A patch of 3 fathoms lies N.W.  $\frac{4}{4}$  N., distant  $1\frac{1}{2}$  miles from cape Siakel.

**Simagup bay**, on the north side of cape Siakel, is a small bay, Lat.  $8^{\circ} 37' N.$  Long.  $117^{\circ} 15' E.$  with reefs drying nearly across the entrance, and a rocky spit extending about a mile from Koreti point, its north extreme.

**Kanipán hill**, 976 feet high, on the eastern shore of Simagup bay, is steep and conical, with two peaks, when seen from the north-westward, the southern being the sharper of the two. Next to the Bulanhau range, Kanipán hill is the highest and most conspicuous object on this part of the coast.

**BULANHAU RANGE**.—To the eastward of Kanipán hill, Lat.  $8^{\circ} 38' N.$  Long.  $117^{\circ} 22' E.$  and nearly in the centre of the island (which is here about 13 miles wide), is the high land of Bulanhau, which attains an elevation of about 3,500 feet. It is of a reddish aspect, rising gradually on the south from a range of hills behind Kanipán; it has a long smooth summit, of which it is difficult to distinguish the highest part. The northern slope has several small sharp peaks with steep shoulders and ravines, amongst the most conspicuous of which is Low-hock, or Low Sharp Bulanhau, generally visible even when the adjacent hills are obscured.

**Se pan gau bay**, situated  $5\frac{1}{2}$  miles north-east from cape Siakel, has apparently two deep inlets, with Cliff point, a small red cliff, to the northward, and two green islets lying near each other immediately under Steep hill, the shoulder of a coast-range to the southward. There are depths of 8 to 9 fathoms at the entrance of the bay, but when well within the points, the mud dries across it.

**Water**.—At  $3\frac{1}{4}$  miles north-east from Cliff point is Rock point, a long bluff head, with a small rock lying off it. To the southward of this point is a sandy bay, the shore of which is lined with casuarina trees, where, at the western extremity near Pine point, there is a good flow of fresh water. Water can also be obtained from Kolobe rivulet, a mile to the southward of Pine point where there is a depth of 4 fathoms close to the beach.

Off Pine point, and also between it and Rock point, reefs dry nearly three-quarters of a mile from the shore; 6 cables beyond the reefs are two patches of 3 and 4 fathoms, coral, with depths of 12 to 15 fathoms between them and the reef.

**PERIGEE BANK**.—The coast between cape Siakel and Cliff point is dangerous to approach, as rocky uneven ground, with many shallow patches, extends in some places  $2\frac{1}{2}$  miles from the shore. The largest of these is Perigee bank, about a mile in extent and steep-to with from one to

Var. 14° E.

$2\frac{1}{2}$  fathoms over it, on which the sea breaks during strong winds; it lies westward of Se pan gau bay, and N.W. by W.  $2\frac{1}{4}$  miles from Providence point.

**Kolobe patch**, situated N.N.E.  $3\frac{3}{4}$  miles from the south-western extremity of Perigee bank, is 2 cables in extent, with  $2\frac{1}{2}$  fathoms water and 22 to 25 fathoms close-to. It lies with cape Siakel bearing S. by W.  $\frac{1}{4}$  W., and Balansungain island (showing as a small flat island, with a peak in the centre) seen clear of Pine point. There are patches of 6 to 8 fathoms within a mile of it.

Lat. 8° 45' N.  
Long. 117° 12' E.

**ANTELOPE SHOAL**, situated W.  $\frac{1}{2}$  N.,  $3\frac{1}{2}$  miles from Kolobe patch, and 6 miles from the shore, is the largest of the Antelope cluster. It is a narrow strip of sand and coral, 7 cables in extent, with  $2\frac{1}{2}$  fathoms water, and 30 and 35 fathoms on either side. From its centre, Balansungain island bears E.  $\frac{1}{4}$  N., and Kanipán hill, S.S.E.  $\frac{1}{2}$  E.

At  $1\frac{3}{4}$  miles S.W. by W.  $\frac{3}{4}$  W. from this shoal, is a 3-fathoms coral patch; and there is also another of the same depth N. by W.  $\frac{1}{2}$  W. about  $1\frac{1}{2}$  miles from it. One mile N.E. by E.  $\frac{1}{2}$  E. from the shoal, is a bank of sand and coral with 2 fathoms of water, and a smaller patch with the same depth three-quarters of a mile North of the latter; all these are steep-to.

**N.E. Antelope shoal**, situated N.E.  $2\frac{3}{4}$  miles from Antelope shoal, is three cables in extent and steep-to; not less than 4 fathoms depth was found on it. From this shoal the summit of Pagoda cliff mount is just seen over the shoulder of Iwiig range, in line with the flat Balansungain island, bearing E. by S.  $\frac{1}{4}$  S., and Kanipán hill, S. by E.

A patch of 2 fathoms lies N.E.  $\frac{1}{4}$  N. 4 miles from North-east Antelope shoal, with Jervois point E. by N.  $\frac{1}{2}$  N. distant 11 miles.

The lead does not give the slightest indication when in the proximity of these shoals, but they can generally be discovered from the masthead.

Large quantities of seaweed are frequently seen in this neighbourhood.

Lat. 8° 56' N.  
Long. 117° 23' E.

**MARASI BAY**.—From Rock point the coast trends eastward 4 miles forming Marasi bay, off the north point of which and distant 6 cables, is a bushy islet named Lita Lita connected with the shore by a reef which also extends the same distance northward of it.

**Balansungain peak**.—From Rock point a comparatively low ridge extends along the south shore of Marasi bay, on which is Balansungain peak, 947 feet high, and which, when first seen from the southward, is conspicuous from being so sharp.

**Iwiig range**.—At the back of the above ridge, fronting Bulanhau and lying parallel with the coast, is a higher range, named Iwiig, with a double hill in the centre, 1,814 feet in height, from which a flat shoulder

extends ; the range then gradually slopes towards some low hills on the plain  $1\frac{1}{2}$  miles to the northward, overlooking the eastern shore of Marasi bay.

**Balansungain islands.**—In the south-western part of Marasi bay, at one mile from Rock point, are two islands of sandstone formation, named Balansungain, lying 3 to 5 cables from the shore ; the westernmost, which is flat, being nearly connected with it by a spit which dries at low water. Reefs, which always show, extend from both extremities of these islands parallel with the shore ; and in the bay there are several coral patches, with small sandbanks dry at low water.

Rocky ground extends  $1\frac{1}{2}$  miles in a N.N.W. direction from the Balansungian islands, having in some places only 3 fathoms water, with 19 fathoms close-to ; also  $1\frac{3}{4}$  miles North of the flat island, and W.  $\frac{1}{4}$  N.  $2\frac{1}{4}$  miles from Lita Lita islet, is a rocky patch of less than 6 feet, with 18 fathoms, mud, around it. Foul ground more or less extends from this to the head of the bay.

There are also two other rocky patches, lying respectively N.W.  $\frac{1}{4}$  N. and N.W. by W. 3 miles from the flat Balansungain island and N.N.E.  $\frac{1}{4}$  E. from cape Siakel. They are each half a mile in extent, and have 4 and 5 fathoms water, with depths of 20 fathoms between, and 28 to 30 fathoms to the westward of them. A depth of 6 fathoms is charted 3 miles N.W.  $\frac{1}{2}$  W. from Lita Lita islet.

**MOUNTAINS.—Aspect.—Pagoda cliff (Tagoraras),** Lat.  $8^{\circ} 45' N.$   
Long.  $117^{\circ} 31' E.$   $5\frac{1}{2}$  miles inland of Marasi bay, is a remarkable limestone cliff, 2,016 feet in height, having a table summit with two clefts, which form pinnacles at either extremity, the southern pinnacle being the sharper : there is a small rock in the gap, conspicuous on a N.W. and S.E. bearing. Pagoda cliff rises immediately above a plain, which extends across the island, separating the Bulanhau and Mantalingahan ranges, being connected with the latter by a high ridge with various peaks of similar character and formation, among the most conspicuous of which are the Hat or Panalingahan ; the Fin, a very sharp pinnacle ; and three sharp hills under the fall of Mantalingahan.

**Mantalingahan mountain,** 6,843 feet high, is of a reddish barren aspect, and when viewed from the westward has a table summit, the north end being the highest part ; while a long smooth shoulder, terminating in three small nipples, slopes gradually to the southward. It has several spurs and lower ranges fronting it, the most remarkable of which is Sallekan, a sharp peak 2,814 feet high,  $5\frac{1}{4}$  miles to the northward.

**Lan dar gun and Gantung mountains.**—From Mantalingahan mountain a high central range extends in a north-easterly direction to the parallel of  $9^{\circ} 10' N.$ , having on it several remarkable peaks, the two highest of which are Lan dar gun, 5,397 feet ; and Gantung, 5,868 feet. Towards the termination of this range there is a table hill with a sharp

Var. 11° E.

nipple, named Kalibugon, 1,793 feet ; and at the extremity,  $2\frac{1}{2}$  miles farther to the north-eastward, is Korumi, a conical hill of less elevation.

**The COAST** from Lita Lita islet trends north-eastward  $13\frac{1}{2}$  miles to Pampangduyang point ; it is low, and has small bays, in some of which there are rivulets of fresh water.

\*Lat. 8° 52' N.  
Long. 117° 27' E.

For 5 miles, as far as Washington head,\* the coast is fronted by a reef which extends from three-quarters to  $1\frac{1}{2}$  miles off shore, having openings here and there with depths of 3 to 6 fathoms ; beyond which only the points of the bays have spits, extending 3 to 5 cables off, with 5 and 6 fathoms close to the edge ; the depths in the bays gradually decrease to 2 fathoms, mud, close to the beach.

**Shoals.**—At  $6\frac{1}{4}$  miles W.  $\frac{1}{2}$  S. from Washington head, there is a shoal with a depth of 4 fathoms ; at  $4\frac{1}{2}$  miles W.  $\frac{1}{4}$  S. from the head a depth of 7 fathoms has been obtained, where there may be less water. At 4 miles N. by W.  $\frac{3}{4}$  W. from Washington head, is a 5-fathoms patch 4 cables in extent lying  $3\frac{1}{2}$  miles from the shore ; there is a patch of 8 fathoms about one mile south-west of it. A shoal about a mile in extent, the centre of three, lies in the approach to Kulassian bay, with Washington head, S.E.  $\frac{1}{4}$  S., distant about  $1\frac{1}{2}$  miles, and Lita Lita islet S.S.W. A patch on which the sea breaks at low water lies  $1\frac{1}{4}$  miles west of Jervois point.

**Caution.**—Vessels should not approach this part of the coast within 3 miles ; the lead gives no warning when near a reef, and the water is not always sufficiently clear to see the danger. The depths from 3 to 5 miles off shore vary from 15 fathoms to 17 and 25 fathoms, muddy bottom, with occasional patches of sand or coral.

**Kulassian bay**, of which no information is at hand, lies northward of Washington head.

**Illán hill**, frequently a useful object on this part of the coast, from the high land being obscured, is a detached hill, 600 feet high, and covered with wood, lying a mile from the coast within Townsend point. There is a low table hill  $1\frac{1}{4}$  miles north-eastward, and a conical hill the same distance south-westward of it ; the latter apparently being connected with it by ridges which extend along the coast close to Jervois point. There are also several densely wooded hills on the plain, not however sufficiently conspicuous to be of service to the navigator.

Lat. 8° 58' N.  
Long. 117° 32' E.

**Pampangduyang point.—Water.**—At  $1\frac{1}{2}$  miles southward of Pampangduyang point, in the bight of a small bay, is a rivulet, from which in favourable weather a supply of good water may be obtained, the entrance being protected by a coral spit. Care is required in approaching, as foul ground with shallow water extends  $1\frac{3}{4}$  miles in a northerly, and one mile in a westerly direction from Pampangduyang point, with 12 fathoms close-to.

**The COAST** from Pampangduyang point trends in a north-easterly Var. 1 $\frac{1}{2}$ ° E. direction  $1\frac{1}{2}$  miles to Eran point, which, as well as the intermediate land, is low, densely wooded, and fronted by reefs drying from a half to three-quarters of a mile from the shore. At  $1\frac{1}{2}$  miles eastward of Lat. 8° 58' N.  
Long. 117° 34' E. Pampangduyang point is a sandy bay, where there is a rivulet of good water. The shore of this bay for a distance of nearly  $1\frac{1}{2}$  miles appears free from reefs; patches of sand and coral, however, nearly dry, lie half a mile off its entrance, with depths of 3 to 4 fathoms between.

**Eran Quoin**, 518 feet high, a quoin-shaped hill, named by the natives Palepaikan, stands on the plain midway between Low and Eran points.

**The Depths** off this part of the coast are generally more regular than those to the southward, and, with the exception of a few patches of 6 or 8 fathoms, gradually increase from 7 and 9 fathoms, near the shore reef, to 30 fathoms, mud, at 6 miles off. There is a small 3-fathoms patch lying  $1\frac{1}{2}$  miles westward of Eran point, and half that distance from Becher point, with the latter in line with Eran Quoin.

**ERAN BAY**, eastward of Eran point, may be readily recognised by Eran Quoin; it is the first bay on the coast from the southward which affords anchorage in south-west winds, and where wood, water, and a few supplies can be obtained.

Lat. 8° 58' N.  
Long. 117° 34' E.

Eran bay is 4 miles wide at the entrance, and open to the northward; at the head of the bay there is a projection named Truce head, off which, and connected with it at low water, is a sandy islet named Bivouac. From this islet the reef extends in a northerly direction three-quarters of a mile. In the south-west corner of Eran bay, is Eran river, which boats can enter under ordinary circumstances, and obtain a supply of good water without going very far up. There are rivulets of fresh water, named by the natives Itlus, to the eastward of Truce head; but in this part of the bay there is a great deal of coral and foul ground.

The population of this and the neighbouring district is about 750, chiefly Dusuns, or hill people, with a mixture of Malays, the head of whom styled himself Panjiran. They collect beeswax and cultivate small tracts of land.

**Supplies.**—Fowls, goats, sweet potatoes, &c., were obtainable by barter. The dollar, either Spanish or Mexican, is the current coin on this coast.

The beach at the entrance of the river is convenient for seining.

**Anchorage.**—The best anchorage is eastward of Eran point, a mile from the shore, in  $6\frac{1}{2}$  or 7 fathoms, stiff mud, with Eran Quoin bearing S.W.  $\frac{1}{2}$  W., and Bivouac islet, S.E. by E., midway between it and the reef

Var. 13° E.

off Bivouac islet, or closer up if necessary; recollecting, however, that as the beach is approached, the bay becomes contracted by reefs, which on the western shore gradually extend from 2 cables off Eran point to half a mile westward of Bivouac islet. Vessels should not anchor in any part of the bay eastward of Bivouac islet, as reefs, with off-lying patches, project some distance from the shore; and a heavy rolling swell occasionally sets in.

**Tides.**—It is high water, full and change, in Eran bay, at 10h. 10m.; springs rise  $6\frac{1}{2}$  feet. See tides, page 31.

Lat. 8° 58' N.  
Long. 117° 49' E.

**Gantung mountain**, 5,868 feet high (page 225), and False Sharp peak (the latter likely to be mistaken when first seen for Sharp or Sallekan peak, 2,814 feet) farther south, overlook this bay, the spurs from which approach very near the coast.

Between the two is Waterfall peak (an abrupt rocky shoulder worn bare by the action of the water usually seen running down the side), the commencement of another range lying parallel to that of Gantung, and which, from the identity of the features near the northern extremity, is designated False Korumi.

**The Coast.**—From Eran bay the coast trends north-north-eastward about 4 miles to Elizabeth point; thence north-eastward about 10 miles to Hummock point. It is similar in character to the coast southward of Eran point, having low abrupt points, from which reefs, dry at low water, project 3 to 4 cables. The bights of the bays formed by these points, in some of which there are streams of fresh water, are usually free from coral, and have from 2 to 3 fathoms close to the beach.

**Aspect.**—**Pulute range**, which is about 7 miles inland, is 3,067 feet high, with a deep saddle to the southward, and a high and a low sharp nipple, the former 2,930 feet in height, on the slope to the northward. Between this and the coast-range there are other hills of less elevation.

Point hill, 560 feet in height, is on Hummock point; from it a low range extends along the coast 5 miles in a south-westerly direction, terminating in a triple-top hill. On the plain to the south-westward of this range is a high wooded mound, between which and False Sharp peak over Eran bay, and fronting the Korumi range, are other hills of nearly equal elevation.

Lat. 9° 11' N.  
Long. 117° 45' E.

**Rock.**—A sunken pinnacle rock lies  $1\frac{1}{2}$  miles N.N.W. of Elizabeth point, with the south end of Malapakkun island touching the north extreme of Marantao islet.

At about 6 miles N.W.  $\frac{3}{4}$  N. from Elizabeth point a shoal with a depth of 5 fathoms is charted.

General chart, 967 [2,659].

**Malapakkun and Marantao islands.**—At 3 miles W. by S. of Hummock point, and  $1\frac{1}{4}$  miles off shore, is Malapakkun, a wooded island 340 feet high, with a double summit, and a round islet 2 cables southward of it.\* There is a channel inshore with 9 and 10 fathoms, but it is not recommended, as fringing reefs project from 4 to 8 cables from the coast, increasing in distance towards Hummock point, and inclosing Marantao island, 247 feet in height at one mile westward of the point.

**Caution.**—Vessels approaching the shore immediately northward of Eran bay should keep Malapakkun island open of Elizabeth point, as the ground is foul in that vicinity. No part of the coast between Eran bay and Malapakkun should be approached nearer than 2 miles, as doubtless other patches exist, besides those which have been charted.

Beyond the distance of 2 miles from the shore, the depths vary from 15 to 25 fathoms, mud, with patches of 5 and 7 fathoms, coral, occasionally.

**NAKODA COVE,** situated about 3 miles north-eastward of Huimmock point, is formed by Mariquit, Nakoda, and Sirinao islands; anchorage may be obtained here in a depth of 4 fathoms, tolerably sheltered in either monsoon. The best position in the north-east monsoon is under the south-east end of Sirinao, and in the opposite season south-east of Nakoda island, observing that the shore reef extends three-quarters of a mile north-westward of Albion head, and to a full mile from the land about one mile south-westward from the head; a detached reef lies about half a mile off the east side of Nakoda.

The entrance between Nakoda and Sirinao is about 4 cables wide between the reefs encircling those islands, with depths of 8 to 11 fathoms. The eastern entrance between cape Albion and Sirinao is only about a cable wide between the reefs and is not recommended.

**Maricaban, Mariquit, and Nakoda islands** lie in the bight of the coast between Hummock point and Albion head, on the reef which fronts the shore as far as the outer extreme of Nakoda. This reef is steep-to, and may be avoided by keeping Sirinao island open northward of Nakoda. Nakoda is described as a high island (probably about 200 feet), but the other two are mangrove islands.

**Sirinao or Sepulcro island** is nearly one mile south-east of Triple-cema island, having in the channel between a depth of 12 fathoms; Sirinao island is a mile in length, the highest part 280 feet above the sea, being near the northern extremity. The southern extreme is a sandy tongue, one mile distant from the nearest part of Albion head, but the channel between is reduced to about a cable in width by the reefs on either side. The island is fronted by a reef which extends nearly half a mile eastward of it, and to about 2 cables in other directions.

Chart. 416 [2,651].  
Var.  $11^{\circ}$  E.

\*Lat.  $9^{\circ} 15'$  N.  
Long.  $117^{\circ} 10'$  E.

Chart. 416 [2,651].  
Var. 14° E.

**Triple-cema island** is situated about one mile northward of Nakoda island, in the approach to Nakoda cove. It is somewhat flat, with three peaks, the highest being 162 feet in height. A reef encircles the island to the distance of half a cable; a coral patch of 3 fathoms lies  $1\frac{1}{2}$  cables off the south side.

**Reefs.**—Nearly three-quarters of a mile N.E. from the highest part of the island is a 5-fathoms patch of coral, with 12 to 15 fathoms, mud, around it. E. by N.  $\frac{3}{4}$  N.,  $1\frac{1}{3}$  miles from the south-east extreme of the island are patches of one to 3 fathoms, extending half a mile in the same direction; they are apparently steep-to.

Lat. 9° 17' N.  
Long. 117° 58' E.

**Albion head**, forming the west extreme of Tebeyu bay, is a bold perpendicular limestone cliff, with stalactite caves, luxuriantly wooded, and having several peaks of nearly equal elevation, the highest being 690 feet.

**Malanut bay**, the western portion of Tebeyu bay, affords shelter in either monsoon for vessels of moderate draught, being protected on the west by Albion head, and on the north by Baja Llanura, a low flat island surrounded by reefs; these reefs extend from one to  $1\frac{1}{3}$  miles in a north-west direction, and to about half that distance from its other sides, with outlying patches in places.

**Fairway reef.**—A coral reef obstructs the fairway between Sirinao and Baja Llanura island. According to the original survey it was about half a mile in length north and south, with a channel on either side of it about 2 cables wide. From its north extreme, Albion head bore S.  $\frac{1}{2}$  E., and the north extreme of Llanura E. by N.; from the south extreme, Albion head was on the same bearing, with Back Cap peak seen over the southern extreme of Llanura island bearing E.  $\frac{1}{2}$  N.

The existing plan shows the reef of less extent, and in two portions, but it is advisable to pass northward of it, as formerly recommended, where the channel is about  $1\frac{3}{4}$  cables wide.

**Tides.**—It is high water, full and change, in Malanut bay, at 10h. 15m., springs rise 6 feet. The stream is scarcely perceptible.

**Directions.—Anchorage.**—The plan should be used with caution. The reef off the west side of Baja Llanura island dries at low water springs, which is the best time to enter; at high water the edge of the reef is not well defined.

Approaching from the westward or northward, steer to pass about 2 cables northward and eastward of Triple-cema island and when abreast it, bearing about S.W., steer E. by S. until Albion head bears S.S.E. then proceed as directed below.

In making the entrance from the north-eastward, the northern end of Triple-cema island must not be brought to bear westward of W.S.W. until the eastern extreme of Albion head bears S.S.E., in order to avoid the

dangers out-lying the reef extending north-westward from Baja Llanura Chart, 410 [2,651].  
Var. 1 $\frac{1}{2}$ ° E.

With the eastern extreme of Albion head bearing S.S.E., Malanut mound, about 6 miles inland, will be seen just clear of it; then steer so as to keep the summit of this about its own width open of Albion head until the northern extreme of Sirinao island bears West, when the edge of the reef surrounding Baja Llanura island will probably be discerned. Close this reef to within the distance of a cable, passing between it and the coral reef in the fairway, until the east extreme of Albion head bears westward of South, when a S. by E. course will lead to the anchorage clear of the reef on either side. The best anchorage is about half a mile east of Albion head, in 4 fathoms, stiff mud, about 2 miles distant from the Military station at the head of the bay. Within this position the bay gradually shoals.

**Settlement.**—A military post, named Alfonso XIII., has been established at the mouth of a small stream in Malanut bay, the western head of Tebeyu bay; it has a small landing pier.

**Malanut river** discharges in the south-eastern part of Tebeyu bay, at the western extremity of a sandy beach, and about half a mile eastward of the settlement; here fresh water may be procured with tolerable facility when the river is swollen, but in the dry season it is difficult for boats to proceed any distance up, from the rocky nature of the bed, and added to which, an extensive flat dries at low water off the entrance.

At about 1 $\frac{1}{2}$  miles up the river there is a landing-place on the right bank, which leads into an open tract of country extensively cultivated.

**Supplies.**—Goats, fowls, yams and vegetables of various kinds were procured by barter.

**Malanut range**, situated on the southern side of Tebeyu bay is 1,630 feet in height, and extends south-eastwards two-thirds of the way across the island, where it terminates in the conical mound Malanut, 1,290 feet in height.

Viewing the range end on, in a north-west or south-east direction, it assumes the form of a precipitous cliff, with steps on its south side.

**COAST.**—**Treacherous bay**, situated about 6 $\frac{1}{2}$  miles north-east of Albion head, is overlooked by two remarkable peaked hills (named by the old navigators Devils Cap peak), the foot of which breaks through the mangrove and forms a conspicuous yellow-looking cliff on the shore three-quarters of a mile to the south-west of it is a stream of fresh water. Back Cap, the highest and inshore peak, is 720 feet in height, and has a small table spur at the back.

Var.  $1\frac{1}{2}$ ° E.

In the western approach to Treacherous bay there are shoals with a depth of 3 fathoms and of one fathom, lying, respectively, north-west 2 miles and north one mile from Durudin point.

Lat.  $9^{\circ} 22'$  N.  
Long.  $118^{\circ} 24'$  E.

**Islands.**—Palm island, the outermost and smallest of a group of four islands, lying between 3 and 4 miles northward of Treacherous bay, is 100 feet high, and has some dark rocks on a sand bank a quarter of a mile north-eastward of it.

The two islands, Tide-pole and Patelan, immediately inshore of Palm island, are moderately elevated, the highest, Tide-pole island, being 205 feet, with a rock on its north-west side. Double island, fronting an indentation in the coast, consists of two low flat islands connected by a small neck of sand.

Reefs, partly dry at low water, extend 6 cables in a south-westerly and 4 cables in a westerly direction from Double island. The channel within it, and also throughout the bay, is encumbered with reef, with depths of 5 and 6 fathoms close to the edge. The passages between Double island and the islands to the westward have from 8 to 12 fathoms.

**Caution.**—It is recommended not to stand into Treacherous bay as the reefs to the northward, as well as to the north-westward of Baja Llanura island, extend a long distance off, and the water is usually so muddy that they cannot be seen.

The depths vary from 10 to 14 fathoms, mud, in the bay; the points of the coast are fronted by reefs, projecting from three-quarters to upwards of a mile, and in the centre of the bay there is a 3-fathoms patch, with 13 fathoms close-to. From this patch, Tide-pole island bears N.E. by N., and Back Cap peak, S.E. by E.

The depths off the coast outside Treacherous bay, are 25 to 30 fathoms, the bottom chiefly consisting of broken coral, with a thin stratum of mud in some places. There is a  $4\frac{1}{2}$ -fathoms patch in the offing, 4 cables in extent, with depths of 20 to 30 fathoms around, with Triple-cema island bearing S. by E.  $\frac{5}{8}$  E. distant  $8\frac{1}{2}$  miles, and Palm island S.E. by E.  $\frac{1}{2}$  E.

**The COAST.—Aspect.**—The coast between Double island and Deep Bay point, 3 miles north-east of it, is low and thickly wooded, and should not be approached nearer than 2 miles, as the edge of the reef dries half a mile from the points, with rocky ground in some places a mile beyond.

Lat.  $9^{\circ} 24'$  N.  
Long.  $118^{\circ} 7'$  E.

From Deep Bay point\* the coast trends north-eastward for 18 miles to Long point; near the latter, apparently a third separation takes place in the high central range of hills; the low land, however, at this part, is considerably above the level of that which divides the range to the southward.

**Victoria peak**, a sharp double peak, the second highest on Palawan island, attaining an elevation of 5,680 feet, occupies a central position on the intermediate range, from which several lower ranges, of not less remarkable feature, extend on either side, forming ravines and deep gorges, thickly wooded. On the south part of the range, End peak, 4,512 feet high, is the most conspicuous, having a small double top, with a shoulder at the back, from which the land falls rather abruptly. The southern face slopes gradually towards the plain behind the Devil's Cap peak, while a part of the same ridge (on which is Sutan peak, 3,820 feet high) lies in a south-easterly direction, and terminates in a long table spur overlooking Island bay on the opposite side of the island.

**Valley Cone.**—From a range immediately in front of Victoria peak a spur extends to Steep point,  $4\frac{1}{2}$  miles north-eastward of Deep Bay point, forming on the north side a valley, at the head of which is Valley Cone, a remarkable conical hill lying beneath three sharp peaks on the ridge above.

The plain in front of the Valley Cone is densely wooded, and 3 miles from Steep point, lying close to the coast, is Cuckold hill, 280 feet high.

On the north side of the valley, the hills again approach the coast near Bluff point, 2 miles to the eastward of Cuckold hill, thence extend along the shore to Moorsom head, a distance of 3 miles.

**Gap range.**—Immediately overlooking these hills is Brow peak or shoulder, 3,840 feet above the sea, forming the extremity of a ridge which here takes a sudden trend to the eastward, attaining an elevation of about 5,000 feet at its highest part, and having two gap peaks on it halfway.

The northern face of this range is a steep slope, with deep ravines, and some conical hills at the foot, of which Brow Cone, 1,180 feet high, over Bluff point, is conspicuous.

**Water.**—A copious stream of fresh water flows into the sea, immediately northward of Cuckold hill.

**Coast.**—The bay northward of Deep Bay point is bold to approach to half a mile, the depth at that distance from it being 10 to 12 fathoms; but from Steep point to Bluff point the coast is fronted by a reef, extending from 3 to 5 cables off, the edge of which is dry in some places, and has a black rock on it at nearly a mile northward of Steep point.

In a small bay southward of Bluff point is a high rock close to the shore.

**Peaked island**, 110 feet high, with a rock 23 feet high nearly three-quarters of a mile westward of it, lies off the entrance of the fresh-water stream before mentioned, and about a mile from the shore, to which

Var. 1 $\frac{1}{2}$ ° E.

In the western approach to Treacherous bay there are shoals with a depth of 3 fathoms and of one fathom, lying, respectively, north-west 2 miles and north one mile from Durudin point.

Lat. 9° 22' N.  
Long. 118° 24' E.

**Islands.**—Palm island, the outermost and smallest of a group of four islands, lying between 3 and 4 miles northward of Treacherous bay, is 100 feet high, and has some dark rocks on a sand bank a quarter of a mile north-eastward of it.

The two islands, Tide-pole and Patelan, immediately inshore of Palm island, are moderately elevated, the highest, Tide-pole island, being 205 feet, with a rock on its north-west side. Double island, fronting an indentation in the coast, consists of two low flat islands connected by a small neck of sand.

Reefs, partly dry at low water, extend 6 cables in a south-westerly and 4 cables in a westerly direction from Double island. The channel within it, and also throughout the bay, is encumbered with reef, with depths of 5 and 6 fathoms close to the edge. The passages between Double island and the islands to the westward have from 8 to 12 fathoms.

**Caution.**—It is recommended not to stand into Treacherous bay as the reefs to the northward, as well as to the north-westward of Baja Llanura island, extend a long distance off, and the water is usually so muddy that they cannot be seen.

The depths vary from 10 to 14 fathoms, mud, in the bay; the points of the coast are fronted by reefs, projecting from three-quarters to upwards of a mile, and in the centre of the bay there is a 3-fathoms patch, with 13 fathoms close-to. From this patch, Tide-pole island bears N.E. by N., and Back Cap peak, S.E. by E.

The depths off the coast outside Treacherous bay, are 25 to 30 fathoms, the bottom chiefly consisting of broken coral, with a thin stratum of mud in some places. There is a 4½-fathoms patch in the offing, 4 cables in extent, with depths of 20 to 30 fathoms around, with Triple-cema island bearing S. by E.  $\frac{5}{8}$  E. distant  $8\frac{3}{4}$  miles, and Palm island S.E. by E.  $\frac{1}{2}$  E.

**The COAST.—Aspect.**—The coast between Double island and Deep Bay point, 3 miles north-east of it, is low and thickly wooded, and should not be approached nearer than 2 miles, as the edge of the reef dries half a mile from the points, with rocky ground in some places a mile beyond.

Lat. 9° 24' N.  
Long. 118° 7' E.

From Deep Bay point\* the coast trends north-eastward for 18 miles to Long point; near the latter, apparently a third separation takes place in the high central range of hills; the low land, however, at this part, is considerably above the level of that which divides the range to the southward.

**Victoria peak**, a sharp double peak, the second highest on Palawan island, attaining an elevation of 5,680 feet, occupies a central position on Lat.  $9^{\circ} 23' N.$  Long.  $118^{\circ} 17' E.$  Var.  $1\frac{1}{2}$  E. the intermediate range, from which several lower ranges, of not less remarkable feature, extend on either side, forming ravines and deep gorges, thickly wooded. On the south part of the range, End peak, 4,512 feet high, is the most conspicuous, having a small double top, with a shoulder at the back, from which the land falls rather abruptly. The southern face slopes gradually towards the plain behind the Devils Cap peak, while a part of the same ridge (on which is Sutan peak, 3,820 feet high) lies in a south-easterly direction, and terminates in a long table spur overlooking Island bay on the opposite side of the island.

**Valley Cone.**—From a range immediately in front of Victoria peak a spur extends to Steep point,  $4\frac{1}{2}$  miles north-eastward of Deep Bay point, forming on the north side a valley, at the head of which is Valley Cone, a remarkable conical hill lying beneath three sharp peaks on the ridge above.

The plain in front of the Valley Cone is densely wooded, and 3 miles from Steep point, lying close to the coast, is Cuckold hill, 280 feet high.

On the north side of the valley, the hills again approach the coast near Bluff point, 2 miles to the eastward of Cuckold hill, thence extend along the shore to Moorsom head, a distance of 3 miles.

**Gap range.**—Immediately overlooking these hills is Brow peak or shoulder, 3,840 feet above the sea, forming the extremity of a ridge which here takes a sudden trend to the eastward, attaining an elevation of about 5,000 feet at its highest part, and having two gap peaks on it halfway.

The northern face of this range is a steep slope, with deep ravines, and some conical hills at the foot, of which Brow Cone, 1,180 feet high, over Bluff point, is conspicuous.

**Water.**—A copious stream of fresh water flows into the sea, immediately northward of Cuckold hill.

**Coast.**—The bay northward of Deep Bay point is bold to approach to half a mile, the depth at that distance from it being 10 to 12 fathoms; but from Steep point to Bluff point the coast is fronted by a reef, extending from 3 to 5 cables off, the edge of which is dry in some places, and has a black rock on it at nearly a mile northward of Steep point.

In a small bay southward of Bluff point is a high rock close to the shore.

**Peaked island**, 110 feet high, with a rock 23 feet high nearly Lat.  $9^{\circ} 30' N.$  Long.  $118^{\circ} 11' E.$  three-quarters of a mile westward of it, lies off the entrance of the fresh-water stream before mentioned, and about a mile from the shore, to which

Var. 14° E.

the reefs dry halfway at low water springs, leaving a small channel between them into the river.

Lat. 9° 29' N.  
Long. 118° 10' E.

About a mile S.W. from Peaked island, and the same distance from the shore, is a 3-feet patch, from which rocky ground extends a mile in a south-westerly direction, with 18 to 20 fathoms, mud, close-to; and W.  $\frac{3}{4}$  S.  $1\frac{1}{4}$  miles from the 23-feet rock off Peaked island, is a  $4\frac{1}{2}$ -fathoms coral patch, with 17 to 23 fathoms close-to. To avoid both these, keep the highest peak of Devils Cap (720 feet) open to the northward of the low land about Deep Bay point.

**Moorsom head**, situated  $3\frac{1}{4}$  miles north-east of Bluff point, is rather a prominent headland, moderately elevated, with a small rock above water half a mile to the westward; a reef awash lies  $1\frac{1}{2}$  miles northward of the head one mile from the shore, with a depth of 7 fathoms within it.

**Water.**—There is a stream of fresh water in a sandy bay on the north side of Moorsom head, and also at the extremity of the beach nearly a mile to the north-eastward.

Lat. 9° 39' N.  
Long. 118° 19 $\frac{1}{2}$ ' E.

**Long point**, situated  $5\frac{1}{2}$  miles north-east of Moorsom head, is densely wooded, moderately elevated, and slopes gradually from the centre, terminating in a rocky coast, with several sandy bights; a reef extends 2 cables from the northernmost point.

**Apurawan roadstead** lies close southward of Long point; here a vessel may obtain a few supplies, such as goats, fowls, vegetables, &c., from the natives, who occupy small farms, scattered over a considerable tract of country inland, and which are approached by the river.

The river is fresh, but it is impracticable as a watering place owing to a reef which extends one quarter of a mile from Apurawan head, and dries across the entrance. A low wooded range, partially cleared, with some huts, extends along the coast southward of the river.

The natives cultivate rice, maize, sweet potatoes, tobacco, and cotton in small quantities, and manufacture from the fibre of the plantain the coloured textile garments usually worn by them. Beeswax and tortoise-shell form articles of export.

**Anchorage.**—The best anchorage is abreast of Apurawan head, in 17 or 18 fathoms, stiff mud and shells, about 2 miles from the shore, with Long point bearing N.E. Rocky ground extends a mile westward of the head where at three-quarters of a mile W. by S. of it there is a depth of only 3 feet, with 4 to 9 fathoms close-to.

**Aspect.**—Within Long point are two peaks, of nearly equal elevation (the northernmost, named Anipahan, being the sharper); they are connected with Long point by a gradual slope in the range, on which are some round-topped hills, usually visible when the more elevated land is capped. There

is a deep valley to the northward, overlooked, by a sharp shoulder 3,606 Var.  $11^{\circ}$  E. feet about the sea, which is the commencement of another central range extending to Ulugan bay.

The most remarkable of these are, mount Stavely, 3,930 feet high (a needle peak rising from the centre of a table-top immediately northward of the sharp shoulder), and two dome-shaped mountains farther northward; the southernmost of these, named Thumb peak, 4,260 feet, is the highest part of the range, the other, mount Beaufort, has a hollow in the highest part.

From mount Beaufort, 3,680 feet, the range gradually falls, and is again almost separated between mount Herschel and mount Peel, a low ridge only connecting them.

Mount Herschel is 2,316 feet in height, and slopes to the south-westward.

**South and North rocks** are two rocks lying parallel with and one mile off the shore, at 3 and 5 miles north-eastward of Long point, with 17 fathoms water between them. South rock is 20 feet high and bold to approach, the depths around it being 18 and 20 fathoms; North rock is nearly covered at high water.

**Water.**—There are some streams of fresh water in the bay abreast, but where the best stream flows the shore is fronted with coral, which extends 2 cables from it, with a depth of 3 and 4 fathoms close to the edge.

**Breakers** were reported in 1896, by the Spanish vessel of war *Albay*, in a position with South rock bearing S.  $29^{\circ}$  E. distant about 7 miles.

**Anipahan**, about 10 miles north-east of Long point, is a small settlement with some cleared ground, on the spur of a hill that approaches the coast from the high range, and terminates in a small rocky point. The coast, 2 miles on either side of this point, is fronted by coral, which extends about 2 cables off, with depths of 3 to 5 fathoms close to the edge.

**HEN and CHICKENS.**—Bluff point, 13 miles north-east of Anipahan point is formed by a spur from mount Herschel, and has a bay to the northward of it; half way between this bay and Table point, 6 miles beyond, is a small group of islets and rocks named the Hen and Chickens, lying  $1\frac{1}{2}$  miles from the shore, with 19 to 27 fathoms water between them and Sprat point. The north-west islet is about 80 feet high;  $1\frac{1}{2}$  miles northward of it is a dry reef or rock, close to which the depth is 25 fathoms.

The depths in the bay vary from 20 to 30 fathoms, mud; but north-west from Sprat point, in the direction of the dry reef, is a rocky ridge, nearly a mile from the point, on which the least water found was  $4\frac{1}{2}$  fathoms.

Chart, 2,913  
[2,653].  
Var.  $\frac{1}{2}^{\circ}$  E.

**Water.**—On the shore are numerous sandy bays free from coral with streams of fresh water in some of them, the supply depending on the season; and on the beach to the northward of Sprat point an abundant haul of fish was taken with the seine.

**Table point**, nearly 3 miles north-eastward of the Hen and Chickens, is a conical hill with a detached rock close off it; at 2 miles eastward, under the table range at the foot of mount Peel, is a waterfall.

**The Coast** between Bluff point ( $6\frac{1}{2}$  miles north-east of Table point) and North-west head, at 4 miles north of it, is of a rocky aspect, with several high cliffs; it is bold to approach, having 17 to 20 fathoms water close-to.

Lat.  $9^{\circ} 59' N.$   
Long.  $118^{\circ} 24' E.$

**Off-lying shoals.**—**Middle shoal**, situated 12 miles off shore, is 2 cables in extent, with  $3\frac{1}{2}$  fathoms water, and 12 to 20 fathoms close-to. From this shoal mount Peel bears E.  $\frac{1}{2}$  N.; and mount Staveley S.S.E.  $\frac{3}{4}$  E.

**Albay shoal.**—The Spanish gunboat *Albay* reported, 1888, the discovery of a shoal having depths of 6 to 9 fathoms water on it, coral and rock, with Long point hill bearing S.S.W.; Bluff point, S.E. by E.  $\frac{1}{4}$  E.; and Table point E. by N.  $\frac{1}{8}$  N.

Lat.  $10^{\circ} 0' N.$   
Long.  $118^{\circ} 30' E.$

**Duhme shoal.**—The master of the German ship *Minerva* reported, 1882, having sighted heavy breakers, in the position given, having an extent of about 2 miles, with the appearance of very shoal water.

**Aspect.**—**Mount Airy**, a double-top summit at the foot of mount Peel, overlooks Fish bay, to the southward of which, between it and mount Herschel, the ridge is low.

Lat.  $10^{\circ} 0' N.$   
Long.  $118^{\circ} 42' E.$

**Mount Peel**, 3,600 feet in height, has an abrupt fall in the spur extending towards mount Airy. The north and western faces have sharp ridges with deep ravines extending to the coast, giving it a bold rocky appearance; and on the eastern side a second peak, Ba hé li, precisely similar in feature, rises to an elevation of 2,406 feet, from which a slope extends in a south-easterly direction nearly across the island.

Karsoglan, a high quoin-shaped hill as seen from the westward, lying to the northward of and connected with mount Peel by a low ridge, is close to the shore midway between Table point and North-west head, and forms part of the range which overlooks Oyster inlet in Ulugan bay.

On the peninsula to the northward of Karsoglan are hills of less elevation, connected with each other by the low ridges which form the head of the inlets in Ulugan bay.

Lat.  $10^{\circ} 8' N.$   
Long.  $118^{\circ} 45' E.$

**Manabure, or North-west head**, 600 feet in height, the north extreme of the peninsula, terminates in a bold precipitous cliff, with a detached rock about 40 feet high at the north foot of it.

**ULUGAN BAY** (native Banog), within North-west head, is Chart, 2,913 [2,653] 2 miles wide at the entrance between Cordelia point and Broken head, Var.  $1\frac{1}{2}$  E. and 8 miles in length in a southerly direction.

Oyster inlet, south-westward of Rita island, affords apparently snug anchorage for all classes of vessels in about 12 to 14 fathoms, mud; see remarks on Anchorage, page 239. The other inlets are apparently all shallow, but the bay has not less than 14 fathoms in the fairway, as far in as the reef which fronts its head to the distance of about a mile.

**Observatory rock** at the north end of Rita island, is in the Lat.  $10^{\circ} 6' 11''$  N.  
Long.  $118^{\circ} 46' 26''$  E. position noted in the margin.

**Aspect.**—The northern part of the eastern shore of the bay is bold, cliffy land, and of reddish barren aspect. Sangbauen, the north peak, 1,816 feet high, has a small table summit when seen in a north-easterly direction, and two sharp nipples on the brow in front of it. Bentoan, 1,730 feet high, situated immediately to the southward of Sangbauen, and separated from it by a wooded valley, which forms the back of the watering bay, is sharp when viewed as above, and has a lower range adjoining it to the southward with four distinct peaks. The remainder of the eastern shore is a shelving mangrove coast fronting a low wooded range on which Harbour hill, 960 feet, with a conical hill, 1,120 feet high south-east of it, are the most conspicuous. This range is separated from the high land of Bentoan by a shallow inlet named Tagnipa, at the head of which is a wooded limestone cliff named Deans head.

**Three-peaked island**, or Kamungyan, 140 feet in height, lies Lat.  $10^{\circ} 9\frac{1}{2}'$  N.  
Long.  $118^{\circ} 46'$  E.  $1\frac{1}{2}$  miles northward of North-west head, on the west side of approach to Ulugan bay from the northward.

A rocky ledge, consisting of sand and coral, extends a mile to the southward of Three-peaked island, almost across the passage, on which the average depth is 9 to 12 fathoms with 20 to 25 fathoms on either side of it, but less water may exist. At  $1\frac{1}{2}$  cables N.N.E.  $\frac{1}{4}$  E. from the summit of Three-peaked island is a rock, which generally shows, with another rock visible only at low water, half a cable northward of it.

**Rita island.**—The western shore of Ulugan bay is undulating high land, with three inlets, and is fronted by Rita island,  $1\frac{1}{2}$  miles in length, north and south, by about 200 yards in breadth; it has a detached rock at its northern extreme, 45 feet in height, named Observatory rock, from which rocky ground with 5 and 7 fathoms water, extends in a northerly direction about 2 cables. The eastern shore of the island is steep-to, having about 20 fathoms within a cable of the coral which fringes it. A reef, dry at low water, extends nearly a cable off Tide-pole point, the southern extremity of the island; the edge of the reef is generally well defined by the discoloration of the water.

Chart. 2,913  
[2,653].  
Var.  $1\frac{1}{2}^{\circ}$  E.

The channel to the westward of Rita island is about 3 cables wide, and has 13 to 17 fathoms in its southern portion, but abreast of South inlet it is greatly encumbered with coral patches, having from 4 to 8 fathoms between them. In heavy northerly gales this channel appears to break right across.

Lat.  $10^{\circ} 5' N.$

Long.  $118^{\circ} 47\frac{1}{4}' E.$

**Magsiapo reef**, with  $1\frac{1}{2}$  to 3 fathoms water only in places, extends about half a mile westward and north-westward of Reef islet, which islet lies nearly 2 cables from Marabay point on the eastern shore of Ulugan bay. Depths of 4 to 8 fathoms on a prong of the reef are charted some 6 cables north-west of the islet, and there are patches of  $1\frac{1}{2}$  to  $2\frac{1}{2}$  fathoms at the same distance south-westward of the islet.

At  $1\frac{1}{2}$  miles S.S.W.  $\frac{1}{2}$  W. from Reef islet is the centre of a rocky patch, more than half a mile in extent, upon which the sea generally breaks at low water. The high nipple (1,254 feet) on the brow of Sangbauen well open of Broken head, bearing eastward of  $N. \frac{3}{4} E.$ , leads westward of it and of Magsiapo reef, and is a good guide for keeping vessels to the westward when working out of the bay until they are northward of the entrance to Tagnipa inlet.

**Kai ho lo and Ba hé li** are two small rivers which empty themselves near the south-west corner of Ulugan bay, and in the rainy season have fresh water very near their entrances. Kai ho lo river breaks through the mangrove between the high ranges of Karsoglap and Kai ho lo. It is navigable for boats about half a mile, where a good stream of water is generally running, but owing to the extensive reefs which encumber the head of the bay, neither this nor the Ba hé li river are good watering places. The Ba hé li has a small islet at its entrance, and is navigable for boats about  $1\frac{1}{2}$  miles. A short distance beyond this is a farm on some rising ground.

Between the two rivers is the small islet Tara kai a wan, nearly half a mile to the southward of which is a white rock; the islet, though small, generally forms a conspicuous object after entering the bay.

**Oyster inlet**, the southernmost inlet on the western shore, is  $1\frac{3}{4}$  miles in length in a W.N.W. direction, being separated from the coast outside by a low ridge nearly a quarter of a mile in breadth. Reefs, which project from both points, contract the channel at the entrance to less than a quarter of a mile in breadth; they also fringe the shore within to the extent of one cable, gradually increasing towards the head of the inlet, where a bank of mud and rocks extends off half a mile, on which good oysters were found. There is a depth of 19 fathoms at the entrance, which depth gradually decreases over a stiff muddy bottom to 9 fathoms, close to the reef at the head of the inlet.

The two inlets to the northward of Oyster inlet are shallow.

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General chart, 967 [2,650].

At  $3\frac{1}{2}$  cables east from Coral point, the south side of the entrance to Oyster inlet, are some detached coral patches, nearly awash at low water. Chart. 2,913  
 $\frac{2,653}{2}$ . Var.  $1\frac{1}{2}$  E.

**Anchorage.**—There is anchorage in Ulugan bay off the south end of Rita island, at the entrance to Oyster inlet, in 20 fathoms, stiff mud. No experience was had of the anchorage in the north-east monsoon. During westerly gales the swell sets home to the head of Ulugan bay, breaking heavily upon the reefs, especially on the eastern shore. In the month of November, during one of these, which shifted to the north-west, H.M.S. *Royalist*, riding with a whole cable at this anchorage, was at times pitching forecastle under. Oyster inlet apparently affords security, at any rate for a steam vessel.

**Water.**—Good water can be obtained in Watering bay, one mile southward of mount Sangbauen. It is not, however, practicable to land there at all times, for, except in fine weather, a heavy swell usually sets in on the stony beach. The anchorage also is open.

Sailing vessels being compelled to water here, should not anchor nearer than one mile from the shore; and they should be prepared to weigh on the slightest indication of a westerly wind, as the swell is liable to come in suddenly. The *Royalist*, while at anchor off this bay in the month of November, was caught in a strong westerly wind which brought in a heavy swell, and with difficulty escaped, being obliged to slip her cable.

**Winds.**—During the fine season, i.e., from April to July or August, fresh south-east winds usually blow over the low land at the bottom of the bay; and in calm weather swarms of butterflies are constantly crossing the bay from the eastern shore.

**Tides.**—It is high water, full and change, in Ulugan bay at 9h. 30m., springs rise  $5\frac{1}{2}$  feet.

No perceptible stream was observed in the bay, except after heavy rains, or when westerly winds had prevailed, when there was a slight outset.

**Directions.**—Vessels bound to Ulugan bay, or any of the harbours of Palawan to the northward, should not except under favourable circumstances, come within the 100-fathoms contour-line of soundings to the southward of the parallel of lat.  $10^{\circ}$  N.

If coming from the southward, it is recommended to be near the edge of the bank at daylight, with mount Peel bearing about E. by S., when Three-peaked island, at the entrance of Ulugan bay, will bear E.  $\frac{1}{2}$  N., distant about 35 miles. Approaching in this direction, the bay will be readily recognised when a considerable distance off, by some high rugged land, and a remarkable dome-shaped hill named St. Paul, just seen over a lower range forming the north point of the bay. At the back of this, Cleopatra needle (sharp peak), the southernmost and highest of a range

Lat.  $10^{\circ} 10'$  N.  
 Long.  $115^{\circ} 48'$  E.

Chart 2,913  
[2,653]  
Var. 1 $\frac{1}{2}$ ° E.

extending  $5\frac{1}{2}$  miles in a north-easterly direction will be seen. To the southward is mount Peel, already noticed, comparatively an isolated mountain, sloping gradually from the summit to the base.

The patch of 6 fathoms, and the charted position of Duhme breakers reported in 1882, should be given a wide berth, and a good look-out kept for other dangers which might possibly exist.

Approaching from the northward the bay is more readily distinguished, by an apparently complete separation between mount Peel and the high land south-westward of Cleopatra range, the low land at the head of Ulugan bay not being discernible until within a few miles of cape Sangbauen.

The bay presents no difficulties to a steam vessel. In a sailing vessel, if with a south-west or westerly wind, pass to the southward of Three-peaked island, not borrowing too much on North-west head, where the vessel is liable to baffling winds under the land. Pass at a convenient distance to the eastward of Rita island, observing the clearing mark for Magsiapo reef, and proceed to the anchorage off or in Oyster inlet.

### PALÁWAN PASSAGE.

**General remarks.**—Directions for navigating Paláwan passage will be found on pages 33, 37, and 244, and a description of Luconia and other shoals in its western approach on pages 149-151.

The dangers near the edge of the bank with depths of less than 100 fathoms which fronts the coast of Paláwan to the distance of 15 to 30 miles, and forms the east side of Paláwan passage, and also those bordering that portion of the China sea charted as dangerous ground, and which form the western side of Paláwan passage, will now be described.

The dangers near the coast of Paláwan island have been mentioned with the coast, pages 221, &c., for the assistance of vessels navigating inshore, though with the present small scale chart, it is not recommended that this should be done without local knowledge.

Lat. S $^{\circ}$  29' N.  
Long. 116 $^{\circ}$  54' E.

**Dangers on Eastern side of Passage.—Murex shoal,** on which the s.s. *Murex* is reported to have struck on 13th August 1901, is apparently a reef of small extent, lying about 3 miles within the edge of the bank and in the northern approach to the North Balábac strait. It is situated, approximately, with Balábac peak bearing about S. 15° E., distant 34 miles; this shoal is the southernmost of the outer dangers off the coast of Paláwan.

Lat. S $^{\circ}$  33' N.  
Long. 116 $^{\circ}$  59' E.

**Herefordshire shoal,** on which the ship *Herefordshire* struck in 1815, is charted about 4 miles within the edge of the bank, as per margin. The position of this shoal was not determined by H.M. surveying vessel *Royalist*, 1850-54, when at work in this locality.

**North Regent shoal**, about 5 miles east-north-eastward of the assigned position of Herefordshire shoal, is a coral shoal with  $1\frac{1}{2}$  fathoms water, about 4 cables in extent and steep-to; it lies with South-west hill bearing S.E.  $\frac{1}{2}$  E., and Pagoda hill E. by N.  $\frac{1}{4}$  N. A patch of  $2\frac{1}{2}$  fathoms lies  $2\frac{1}{2}$  miles E.N.E. of North Regent shoal. For South Regent shoal, &c., see page 222.

**Breaker reef**, with a few rocks dry at low water, lies N.E.  $\frac{3}{4}$  E., about 5 miles from North Regent shoal. It is about 3 cables in extent, steep-to, with South-west hill bearing S.S.E.  $\frac{1}{2}$  E., and the Pagoda hill E.  $\frac{3}{4}$  N., showing southward of a double peak on the Iwiig range. A coral patch with 4 fathoms lies  $1\frac{1}{2}$  miles E.S.E. of Breaker reef rather in the fairway of the inshore channel.

**Foul ground**.—A rock with  $2\frac{1}{2}$  fathoms lies  $1\frac{3}{4}$  miles westward of Breaker reef; a patch of  $4\frac{1}{2}$  fathoms N.  $\frac{1}{2}$  W. 3 miles; another patch of  $4\frac{1}{2}$  fathoms N.W.  $\frac{1}{2}$  N., 6 miles, only 2 miles within the edge of the 100-fathoms line; a patch of 4 fathoms W. by N.  $\frac{1}{2}$  N., distant 5 miles, and one of 5 fathoms W.  $\frac{1}{2}$  N., distant 6 miles from Breaker reef. There are other patches of from 6 to 10 fathoms, coral, near the edge of the bank, with depths of 30 to 70 fathoms around, generally mud bottom; these will be seen on the chart.

The Antelope shoals, inshore, are described on page 224.

**Merlin shoals**.—The westernmost of several shoal patches, discovered by H.M.S. *Merlin*, 1885, lies N. by E.  $\frac{1}{8}$  E. distant  $9\frac{1}{2}$  miles from Breaker reef; from it, two small shoals bear E.  $\frac{1}{2}$  N., distant respectively  $3\frac{1}{2}$  and 4 miles.

A shoal with 4 fathoms lies N.E.  $\frac{1}{2}$  E., 6 miles from the easternmost shoal, with Eran Quoin bearing N.E. by E.  $\frac{5}{8}$  E., and Low Hock hill S. by E.  $\frac{3}{4}$  E.; a shoal, with a depth of 5 fathoms, lies W.S.W. from the 4-fathoms shoal, distant nearly 2 miles, and another with 7 fathoms lies W.S.W., distant nearly 5 miles.

**Parakwas ridge**, the centre of which is situated about 16 miles N.  $\frac{1}{2}$  E. from Breaker reef, parallel with and a mile inside the edge of the bank, is formed of coarse sand and shells, is 8 miles in length, with a narrow ridge of coral having gaps through it; on the ridge the least water found was 5 fathoms; the average depth being 6 to 9 fathoms, with 20 to 30 fathoms close-to. The outer edge of this ridge is steep-to, having in many places 60 to 70 fathoms within 2 or 3 cables of it. From the centre of the ridge, where the least depth, 5 fathoms, was found, Mantalingahan mountain bears E. by S., and Kanipán hill S. by E.  $\frac{3}{4}$  E.

**Vanguard shoal** is a coral patch 2 cables in extent, with one foot water, lying E. by S.  $5\frac{1}{4}$  miles from the shoalest part of Parakwas ridge, and 12 miles off shore, with Kanipán hill bearing S.  $\frac{1}{2}$  E., and Mantalingahan, E. by S.  $\frac{1}{8}$  S.

Chart, 907 [2,650].  
Var. 14° R.

Lat.  $8^{\circ} 41' N.$   
Long.  $117^{\circ} 8' E.$

Chart. 967 [2,050]. Between this shoal and Parakwas ridge the depths vary from 30 to Var.  $1\frac{1}{4}$ ° E. 50 fathoms.

Lat.  $9^{\circ} 5'$  N.  
Long.  $117^{\circ} 18'$  E. **Scalesby Castle shoal** is a coral patch 2 cables in extent, with a depth of  $2\frac{1}{2}$  fathoms, and 30 fathoms close-to, lying N.E.  $\frac{1}{4}$  N. 8 miles from the north extreme of Parakwas ridge, and  $1\frac{1}{2}$  miles within the edge of the bank. From this shoal Bulanhau high peak bears S. by E.; Pagoda S.S.E.  $\frac{1}{4}$  E.; and Eran Quoin E.  $\frac{1}{2}$  S.

**A shoal**, with a depth of 3 fathoms, lies E.  $\frac{1}{4}$  N. distant 8 miles from Scalesby Castle shoal, from which Eran Quoin bears E. by S., and is distant nearly 12 miles; a  $4\frac{1}{2}$ -fathoms patch lies in the same direction 4 miles nearer the Quoin,  $6\frac{1}{4}$  miles from Low point.

Lat.  $9^{\circ} 13'$  N.  
Long.  $117^{\circ} 31'$  E. **Collingwood shoal**, lying N.E. by E.  $\frac{1}{4}$  E., 15 miles from Scalesby Castle shoal, and 6 miles within the edge of the bank, is half a mile in extent, and on it the least water found was  $2\frac{1}{2}$  fathoms, with 26 to 28 fathoms close to its western or outer edge, the depths in the neighbourhood being 40 to 45 fathoms, stiff mud. From this shoal Eran Quoin, the nearest land, bears S.E.  $\frac{1}{2}$  S. 12 miles; and Pagoda hill (which is very conspicuous on this bearing over the low land, and generally discernible when the elevated objects are obscured), South.

**Coral patches.**—From Scalesby Castle shoal to the parallel of lat.  $9^{\circ} 35'$  N., a distance of 40 miles, the coral patches on the edge of the bank of soundings are so numerous that to give a description or bearings for each separately would tend more to confuse than make clear the directions for the navigation of this part of the Passage. The least water that has been found on them is  $4\frac{1}{2}$  fathoms, and they may generally be distinguished by an ordinary look-out from the masthead. Two patches of this depth are charted near the edge, at 12 and 33 miles north-eastward of Scalesby Castle shoal. It is, however, recommended to avoid the neighbourhood, as it is impossible to say whether there may or may not be shoaler spots which have escaped detection. The average depth upon the patches is from 6 fathoms (a few, however, have only 5 or  $5\frac{1}{2}$  fathoms) to 7 and 9 fathoms, with 15 and 20 fathoms close to their edges.

Lat.  $9^{\circ} 33'$  N.  
Long.  $118^{\circ} 8'$  E. **York breakers**, on which the *Countess of London* is supposed to have been wrecked in November 1816, is a coral shoal, 4 cables in extent, with one foot water, and except in fine weather, generally breaks. It lies  $6\frac{1}{2}$  miles within the edge of the bank, and has a depth of 45 fathoms close-to. From York breakers, Victoria peak bears S. by E.  $\frac{1}{4}$  E., and mount Peel E. by N.  $\frac{1}{8}$  N.

**Coral patches.**—There is a coral patch of  $3\frac{1}{2}$  fathoms, lying S.W.  $\frac{1}{3}$  S., 4 miles from the centre of the York breakers; and  $1\frac{1}{2}$  miles westward of it is another, with 4 fathoms, the latter lying  $3\frac{1}{2}$  miles within the edge of the bank, with a bank of coarse sand intervening, on which the least known depth is 11 fathoms.

The depths in the neighbourhood of these shoals are from 40 to Chart, 967 [2,650].  
50 fathoms, mud. Var. 1 $\frac{1}{2}$ ° E.

**Gode shoal** was reported in 1860, but its existence is apparently Lat. 10° 13' N.  
doubtful; its assigned position, about 21 $\frac{1}{2}$  miles N.W.  $\frac{3}{4}$  W. from mount Long. 118° 25' E.  
Peel, lies 10 miles within the edge of the bank.

**Crescent reef**, with 4 fathoms water, is a narrow strip of coral, Lat. 10° 40' N.  
three-quarters of a mile in length in an E.N.E. and W.S.W. direction, Long. 118° 42' E.  
lying 1 $\frac{1}{2}$  miles within the edge of the bank, and 22 miles from the nearest shore. There are depths of 40 to 44 fathoms within half a mile of its edge.

From the centre of Crescent reef, Sangbauen, the north peak of Ulugan bay, bears S. by E.  $\frac{1}{4}$  E.; summit of Kaknipa or High island E.S.E., and the highest part of Boayan island E. by S.

At 2 $\frac{1}{2}$  miles south from the Crescent reef there is a 7-fathoms patch, with depths of 36 to 40 fathoms close-to; and E.N.E. 2 $\frac{1}{2}$  miles from the same is another patch, 3 cables in extent, having only 4 $\frac{1}{2}$  fathoms on it, with 40 fathoms close-to.

**Kapoas cluster.**—Between Crescent reef and the Kapoas cluster, the depths are irregular, with several patches of 5 and 6 fathoms, lying from one to 6 miles within the edge of the bank. They are too closely grouped and too far off shore for bearings to be of any advantage to vessels navigating between them.

Near the outer edge of the bank, at 10 $\frac{1}{2}$  miles N.  $\frac{3}{4}$  E. from Crescent reef, is the Kapoas cluster, composed of a 5-fathoms coral patch with upwards of 40 fathoms water close-to, and a 6-fathoms patch 1 $\frac{1}{2}$  miles S.W. of it. From the former mount Kapoas bears E.  $\frac{1}{4}$  S., distant 32 $\frac{1}{2}$  miles.

At 9 $\frac{1}{2}$  miles N.E. by E. from the 5-fathoms patch is a 4 $\frac{1}{2}$ -fathoms coral patch, apparently the northernmost of the Kapoas cluster; it is 3 cables in extent, with 50 fathoms close to its western edge. At 5 miles N.E.  $\frac{1}{2}$  N. from the same patch is one of 4 fathoms, near the edge of the bank,\* and it is here that the least water has been found. Vessels should \*Lat. 10° 54' N.  
avoid this part of the bank. Long. 118° 47' E.

**The Bank.**—From the northern end of the Kapoas cluster, the 100-fathoms edge of the bank trends North, preserving a distance of about 30 miles from the shore, to the parallel of 11° 12' N., when it gradually takes a north-easterly direction and does not approach the north point of Palawan nearer than 23 miles; the bank is steep-to. Here and there it has comparatively shallow ridges (15 to 20 fathoms) of coarse sand and broken coral, on which there are some 7 and 9 fathoms patches of coral lying close to the edge. The northernmost and shoalest of these that has been discovered, and on which the depth is 7 fathoms, lies 1 $\frac{1}{2}$  miles within the edge of the bank, in the position given,\* distant 25 miles from \*Lat. 11° 28' N.  
the nearest part of Palawan; the depths in the vicinity vary from 20 to Long. 119° 1' E.  
40 fathoms.

Chart, 967 [2,650].  
Lat. 11° 30' N.  
Long. 119° 0' E.  
Var. 1 $\frac{1}{2}$ ° E.

The nature of the bottom near the patches is usually fine sand, but when fairly on the bank, especially off the north part of Paláwan, stiff green mud predominates. The bank farther to the northward does not appear to be so steep as that abreast of the island.

**Directions.**—Northward of the parallel of lat. 10° N., the depths on the bank are more regular, and the coral patches lying near the edge, have generally more water on them than those to the southward, seldom having less than 7 and 9 fathoms to the parallel of 10° 40' N., where they have as little as 4 fathoms in some places. Vessels, therefore, bound to Ulugan bay, page 237, or wishing to close with the land for the purpose of working up in shore, should approach the bank about the parallel of 10° 7' N., with mount Peel on about an E. by S. bearing. The bank on this parallel extends 30 miles from the coast.

The first soundings obtained on the edge will generally be 18 or 20 fathoms, coarse sand and broken coral, or perhaps, if a little northward of the bearing given, 9 to 12 fathoms, coral, when the bottom will be visible, after which the depth will be more regular, the 40 and 50 fathoms soundings being chiefly on a stiff muddy bottom; while in less water, sand and mud, or sand and broken coral, will predominate. If when soundings are first struck the vessel can head for Three-peaked island at the entrance to Ulugan bay, bearing about E.  $\frac{1}{2}$  N., the reported positions of Gode shoal and Duhme breakers will be avoided.

### DANGERS on the western side of the Passage.

\*Lat. 8° 51' N.  
Long 116° 16' E.

—**Half-Moon shoal**, has a rock named the Inclined rock\* which always shows above water, on its south-eastern side. The shoal, formed by a belt of coral even with the water's edge, of an average width of about one cable, is of oblong shape, nearly 3 miles in length, in a north-east and south-west direction, with a breadth of one mile. On the eastern side, at 2 and 5 cables southward of the Inclined rock, there are two channels into the lagoon, the southernmost of which has a depth of 4 to 9 fathoms in it, and is marked by a cluster of rocks on its north side awash at half tide, and which generally show. Other half-tide rocks are interspersed over the belt. The average depth in the lagoon is 14 to 16 fathoms, with numerous patches of coral scattered about it. From the shoals, Balábac peak (not in sight) bears S.E.  $\frac{2}{3}$  S., distant 71 miles.

**Tides.**—It is high water, *five days* after full and change, at Half-Moon shoal at 10h. 45m., and the rise is about 4 feet.

**Royal Captain shoal** lies E.N.E. about 24 miles from Half-Moon shoal, contracting Paláwan passage, which is here the narrowest part, to about 27 miles between it and the shoal heads on the bank southward of Parakwas ridge; Observation rock,\* at its north extremity, shows at half tide, and from it Bulanhau mountain bears S.E. by E.  $\frac{1}{2}$  E. distant 48 miles. In clear weather the high land of Manta-

\*Lat. 5° 2' N.  
Long. 116° 39' E.

linghan is visible from this distance. The shoal is elliptical, the length being  $1\frac{1}{4}$  miles in a north-west and south-east direction, with a breadth of one mile. The coral belt, on which a few rocks are visible at low water, is covered at high water, and varies in width from a half to 2 cables. There are depths of 15 to 17 fathoms, sand and coral, with several coral patches in the lagoon. There is no entrance, but at high water a boat can cross the belt. The outer edge is steep-to, having no bottom with upwards of 100 fathoms within half a cable of the reef.

**Bombay shoal** lies N.N.E.  $\frac{1}{8}$  E. 29 miles from the Royal Captain shoal, and is steep-to. From Madagascar rock\* on its north-east extreme, which shows at half ebb, Mantalingahan mountain bears S.E.  $\frac{1}{8}$  E., distant 56 $\frac{1}{2}$  miles, and is visible in clear weather.

This shoal is circular in shape and about one mile in diameter. The lagoon, in which there are depths of 16 to 18 fathoms, sand, is completely enclosed by the coral belt on which three or four rocks show at half tide, the most conspicuous being at the north-west and west extremes of the shoal.

**Tides.**—It is high water, *seven days* after full and change, at the Bombay shoal, at noon; rise about 4 feet. While the tide was rising, the current was observed setting to the north-eastward.

**Carnatic shoal** charted N.N.E.  $\frac{1}{8}$  E., 47 miles from Bombay shoal, is referred to with other doubtful shoals, page 248.

**Seahorse or Routh shoal**, forming the northerumost known danger on the western side of Palawan passage was examined by H.M. surveying vessel *Riflemen*. It is a pear-shaped coral bank 8 miles in length, in a north-north-east and opposite direction, and from 3 to  $4\frac{1}{2}$  miles in breadth. The least known depth is  $4\frac{1}{2}$  fathoms, which was found on a patch, about three-quarters of a mile in extent, at the north extreme of the bank.\* No less depth than 6 fathoms was obtained on any of the other patches surrounding the lagoon; the depths in the lagoon vary from 17 to 20 fathoms at the edge, to 35 fathoms in the centre.

**DANGEROUS GROUND.—SHOALS, THE POSITIONS OF WHICH ARE ONLY APPROXIMATE, LYING OUT OF THE TRACKS RECOMMENDED FOR VESSELS.**

**Caution.**—The shoals lying in and bordering the ordinary routes to China have been given in Chapter III. The shoals about to be described lie out of the tracks recommended for shipping, and the following valuable observations of Horsburgh should be carefully attended to:—

“ The archipelago of sand banks, rocks, or reefs above and under water lying between the coast of Palawan and Pulo Sapatu, is so extensive, and the dangers that form it so numerous, that there can be little utility in entering into a minute description of them, for indeed they ought to be avoided by all navigators. No vessel can enter within the limits of this dangerous archipelago, *marked by a pecked line*, without getting

Chart. 967 [2,630].  
Var.  $1\frac{1}{4}$  E.

\*Lat.  $9^{\circ} 20' N.$

Long.  $116^{\circ} 56' E.$

\*Lat.  $10^{\circ} 50' N.$

Long.  $117^{\circ} 47' E.$

Chart, 067 [2,650]. embarrassed amidst the shoals; there are strong currents or irregular tidal streams among them, which render a vessel's position very uncertain when observations cannot be obtained. Although some vessels have with difficulty and risk passed through them, others have struck or lost their anchors amongst the extensive coral flats; and many have been wrecked."

Most of the disasters which have happened to shipping in the China sea have been consequent upon a disregard of the above advice.

In the following descriptions we shall first refer to those shoals which lie near the Palawan passage, and afterwards those which lie nearer the Main route, beginning at the southern end of the unsurveyed ground.

#### SHOALS NEAR THE PALAWAN ROUTE.

Lat. 7° 38' N.  
Long. 113° 53' E.

**Breakers**, in the position given in the margin, were reported to have been seen in 1860 by Mr. Dallas, while proceeding from the wreck of the *Fiery Cross* to Labuan in the boats (see page 250, Lizzie Webber shoal).

Lat. 7° 58' N.  
Long. 113° 50' E.

**Mariveles reef**.—The Spanish steam vessel *Mariveles*, 1879, struck on a coral reef reported to lie in the position noted. This reef is said to be about 4 miles in length, 2 miles in breadth, and to be nearly awash, with a depth of 54 fathoms close-to.

**Gloucester and Ardasier breakers** are two doubtful shoals; the former is placed upon the chart in lat. 7° 50' N., long 114° 15' E.; and the latter in lat. 7° 56' N., long 114° 2' E. It is probable that these reported dangers, including the breakers mentioned above, form part of Ardasier bank; see page 151.

Lat. 8° 5' N.  
Long. 114° 31' E.

**Investigator shoal**, examined by Captain Crawford of the Indian Navy surveying vessel *Investigator*, in 1813, is about 20 miles in length, east and west, by 4 miles in breadth; its western extreme is in the position given in the margin.

Lat. 8° 30' N.  
Long. 114° 21' E.

**Cay Marino** is a doubtful shoal, charted in the marginal position.

**S.W. and N.E. Shea shoals** were seen by Mr. Shea, commanding the *Buckinghamshire*, in 1833. The first shoal appeared to consist of two reefs of rocks, with high breakers, extending 1½ miles E. by S. and W. by N. and half a mile north and south; the centre of which was found to be in lat. 7° 59' N., long. 114° 52' E.

The other shoal appeared to consist of two dry white banks, with a ridge of rocks extending from them to the westward about 2 miles; which was considered to be in lat. 8° 30' N., long. 115° 15' E.

Lat. 7° 30' N.  
Long. 115° 0' E.

**Viper shoal**, the existence of which is doubtful, is said to lie in the position noted. The *Royalist* passed over its assigned locality, and when on the spot could get no bottom with 500 fathoms; though the day was clear, and conditions good for detecting a danger, nothing to indicate one was observed. The *Saracen* subsequently passed over this ground with a view to discover the shoal, and with the same result.

**North Viper shoal**, or Seahorse, reported to be about 5 miles in var.  $1\frac{1}{2}$ ° E. extent, with rocks above water, is charted in lat. 8° 2' N., long. 115° 23' E. The reported position of this shoal was not examined by the *Riflemen*. The *Saracen* passed near it without seeing any appearance of shoal water, but from the following account of a reef seen by Mr. Baird, this danger would appear to lie 17 miles N.  $\frac{1}{2}$  E. of its ascribed position on the chart.

**Commodore reef**.—Mr. Hugh Baird, commanding the ship *Commodore*, reported as follows:—On 22nd December 1862, at 8 a.m., saw what I took to be the North Viper shoal, or Seahorse, the north-east end bearing by compass N.N.W. 3 miles; it seemed to extend over 3 miles north-east and south-west, and to be composed of partly dry sand, with several rocks from 20 to 30 feet above water, and heavy breakers all around it. At noon it bore W. by S., distant about 6 miles. Observations placed the shoal in the position given.

**Glasgow bank**.—Mr. Baird, commanding the ship *Glasgow*, is said to have discovered a bank in lat. 8° 29' N., long. 115° 31' E. It apparently extended from this position for a distance of 3 miles to its north-east edge, and was composed of sand and rocky heads, in some places 20 to 30 feet above water. (*Naut. Mag.*, 1865, p 52.) It is possibly identical with Commodore reef.

**Director shoal**.—The British bark *Director*, on November 8th, 1887, when bound from Singapore to Shanghai, is reported to have struck on a shoal in the position noted.

**Alicia Annie shoal**.—Captain R. Kirby, 1865, reported having seen a reef in lat. 9° 25' N., long. 115° 19' E., of lagoon form, 3 miles in length, north-west and south-east. There is a low sand bank at its north-west end, and a reef of rocks at its south-east extreme with several detached rocks around. There was a portion of wreck on the south-east end, and a junk with four boats close by; inside the lagoon there was a boat, apparently fishing. Soundings were tried for at a quarter of a mile from the south-east end, but no bottom was found with 100 fathoms of line. First Thomas shoal was made the next day, and the chronometer showed it to be 2 miles west of its position on the chart. (From *Merc. Mar. Mag.*, 1865, p. 29.) Two shoals marked Pennsylvania are charted between this shoal and North-east Shea shoal.

**First and Second Thomas shoals** appear by the chart to have been seen in 1839. The first is placed in lat. 9° 18' N., long. 115° 53' E.; the second is shown as being 9 or 10 miles in length, and 4 miles in breadth; its southern part is charted in lat. 9° 41' N., long. 115° 47' E.

**Investigator N.E. shoal**, in the position noted in margin, is apparently awash.

**Pennsylvania and Sabina shoals**.—One of the many doubtful Pennsylvania shoals is placed on the chart about 19 miles north-

Chart, 967 [2,650]. ward of Investigator N.E. shoal, in lat.  $9^{\circ} 32'$  N., long.  $116^{\circ} 22'$  E.; and Var.  $1^{\circ}$  E. there are three other patches of that name, about 10 miles north and north-eastward of Sabina.

Sabina shoal, charted in lat.  $9^{\circ} 42'$  N., long.  $116^{\circ} 34'$  E., was discovered by the master of the *Sabina* in 1836, who saw "rocks with the sea breaking over them." It is probably identical with one or more of the above. (From *Naut. Mag.*, 1836, p. 601.)

Mr. E. Routh, commanding the *Bombay* (1837) with the *Henry Clay* in company, sighted breakers, which his observations placed nearly in the position of Sabina shoal. (*Naut. Mag.*, 1837, p. 224.)

**Carnatic shoal** is charted N.N.E.  $\frac{1}{4}$  E., 47 miles from Bombay shoal, and is said to have as little as  $3\frac{1}{2}$  fathoms water on it. H.M. surveying vessel *Royalist*, in 1853, could not discover the shoal in the position assigned to it, or succeed in obtaining soundings with from 100 to 200 fathoms of line when in the neighbourhood.

**Lord Auckland shoal** appears on the chart as a bank with from 8 to 30 fathoms water over it. The 8-fathoms part is in lat.  $10^{\circ} 21'$  N., long.  $117^{\circ} 15'$  E.; close to the eastward of the bank there is no bottom at 100 fathoms.

**Fairy Queen shoal** with 9 fathoms water, is charted in the position here given.

**A Sandy shoal** is placed upon the chart, about 14 miles N.E.  $\frac{1}{2}$  N. of Seahorse or Routh bank (*see* page 245), in lat.  $11^{\circ} 2'$  N., long.  $117^{\circ} 37'$  E.

**Templer bank.**—The *Minerva* passed over a bank in November 1835, having from 10 to 12 fathoms water. The bank appeared to extend about 4 miles north and south, and as no discoloured water was seen to the eastward, but several apparently shoal patches were perceived to the westward, it is supposed that the vessel passed over the eastern part of the bank. The centre of the bank is charted in the position given.

**Other Pennsylvania shoals.—Brown shoals.**—Another Pennsylvania shoal is placed on the chart in lat.  $10^{\circ} 23'$  N., long.  $116^{\circ} 33'$  E.; and yet another, the Pennsylvania North reef, in lat.  $10^{\circ} 49'$  N., long.  $116^{\circ} 50'$  E. (HORSBURGH places this shoal in long.  $117^{\circ} 10'$  E.) The positions of these are very doubtful, and it is probable that the shoals seen by Mr. Brown commanding the *Arabian* in 1838, were the same; the following is his account of them (*in Naut. Mag.* 1838, p. 721):—

"On the 8th January, 1838, at 10.30 a.m., passed close to windward of a coral patch, with apparently 5 or 6 fathoms water over it, in lat.  $10^{\circ} 30'$  N., long.  $116^{\circ} 41'$  E. Wind was fresh with a good deal of sea.

"Same day, at 3.30 p.m., came suddenly into shoal water. Saw the rocks very distinctly under the bottom, had several casts of about

5 fathoms. We appeared to be on the southern edge of a coral flat, Chart. 967 [2,650]. Var.  $1\frac{1}{2}$ ° E. extending north-east and north-west from us for some miles. By sights taken immediately we came off the shoal, this part of it lies in long.  $117^{\circ} 0' E.$ , or 4' east of the Bombay reef, which we left yesterday; latitude  $10^{\circ} 35' N.$ , which we observed at noon.

"The following day at 9 a.m., came again into shoal water; rocks seen close to our keel, but before we could get the lead forward we had passed over the ridge into 28 fathoms. From 9h. to 11h. 30m. a.m. ran 8 miles on a N.N.W. course over irregular coral bottom, least water, by the lead, 11 fathoms, but at times we apparently had much less from the proximity of the coral rocks. We entered upon this flat in lat.  $10^{\circ} 39' N.$ , long.  $117^{\circ} 24' E.$ ; came off in lat.  $10^{\circ} 46' N.$ , long  $117^{\circ} 19' E.$  The longitude computed from a series of sights before and after noon; the latitude by a good meridian altitude, four observers, and clear weather. In passing over this bank the water appeared very shoal east and west of us, lying in ridges in that direction."

**Amy Douglas shoal.**—The *Amy Douglas* passed over a shoal Lat.  $10^{\circ} 52' N.$ . Long.  $116^{\circ} 25' E.$  about noon in a position ascertained from good observations. The water was observed to be discoloured for about a mile on each side of the ship, and on sounding a depth of 14 fathoms was obtained. The master was of opinion that the water was much shallower to the westward of the ship. (*Naut. Mag.*, 1860.)

**Reed bank.**—H.M.S. *Riflemen* obtained soundings of 47 fathoms on a coral bank in lat.  $11^{\circ} 28' N.$ , long.  $116^{\circ} 46' E.$ ; steering E. by S.  $\frac{1}{4}$  S., 3 miles farther, had 44 fathoms, and shortly afterwards 12 fathoms on a coral patch in the position noted in margin. Continuing the same Lat.  $11^{\circ} 26' N.$ . Long.  $116^{\circ} 53' E.$  course, the depths were 42 fathoms for a distance of 5 miles, when the water deepened.

**Marie Louise shoal.**—The German barque *Marie Louise*, 1885, Lat.  $11^{\circ} 55' N.$ . Long.  $116^{\circ} 51' E.$  passed over a shoal in the marginal position. A sounding was obtained in 15 fathoms, the bottom being seen and remaining visible for a distance of 3 or 4 cables.

**West York island**, so named from the vessel wrecked on it in 1905, is situated in lat.  $11^{\circ} 51' N.$  and long.  $115^{\circ} 1\frac{1}{2}' E.$ , about 50 miles E.S.E. from North Danger islands. It is of coral formation and about one mile in length by half a mile in breadth and 15 feet in height. On it are a few cocoanut trees and some other vegetation, and it is frequented by turtle and sea birds.

A coral reef surrounds this island which extends a quarter of a mile off shore on its east side and fully two miles to the southward. Anchorage was obtained by the U.S. vessel *Naushon* in 14 fathoms with the north

Chart 967 [2,650]. point of West York island, bearing S.  $25^{\circ}$  W. distant  $2\frac{1}{2}$  miles. Chinese Var.  $1\frac{1}{4}^{\circ}$  E. fishermen from Hainan appear to frequent it during the latter part of the N.E. monsoon to gather trepang, as a joss house and three graves were found on the island, as well as an old iron cannon. Some remains of wrecks were also seen.

**Flat island** is a low sand cay about 250 yards across and surrounded by a reef which extends 2 to 3 miles from the cay in an easterly direction. The cay is situated in lat.  $10^{\circ} 48\frac{1}{4}'$  N. long.  $115^{\circ} 50\frac{1}{2}'$  E., and about 16 miles S.E. of its originally reported position. The *Nanshan* passed over that position without seeing any danger there. See page 251.

**Nanshan island**, situated in lat.  $10^{\circ} 42\frac{1}{4}'$  N. long.  $115^{\circ} 49\frac{1}{4}'$  E., is about 600 yards across and appeared to be covered with small trees.

#### SHOALS NEAR THE MAIN ROUTE.

Returning again to the southern portion of the dangerous unsurveyed ground, the shoals eastward of those bordering the Main route which have been surveyed, will now be described.

**Lizzie Webber shoal.**—Mr. Dallas reported that while returning Lat.  $8^{\circ} 4' N.$   
Long.  $113^{\circ} 12' E.$  in a small vessel, the *Lizzie Webber*, to the wreck of the *Fiery Cross*, in 1860, they struck upon a reef in the position given. This reef, which was very little under water, is a narrow strip of sand and coral lying in a north-east and south-west direction.

This shoal is supposed to extend about 25 miles to the north-eastward of the above position, for Mr. P. Orr, commanding the barque *Canada*, reported as follows:—

“On the 24th December 1864, at 12.30 a.m., the British barque *Canada* was wrecked on a reef in the China sea—not marked on the charts. The ship’s lat. brought on from the previous noon was  $8^{\circ} 20' N.$ , long.  $113^{\circ} 29' E.$  After leaving the ship we skirted the weather side of the reef until noon; when we cleared the south end, I at that time got a meridian observation which put us in lat.  $8^{\circ} 3' N.$ , we were then about one mile south of the reef which is awash. I estimate the distance made in the boats from the time we left the ship till we cleared the south end of the reef to be 25 miles.” This latitude of the southern end of the shoal agrees within a mile with that of the *Lizzie Webber*.

**Pearson reef** was seen in 1843 by Mr. Pearson, commanding the *Bahamian*, who reported that he passed at about 3 miles from a shoal in the position noted, which was about 2 miles in length in a north and south direction, with some rocks above water on the southern edge.

**Doubtful shoals and islands.**—Cornwallis south reef is placed on the chart in lat.  $8^{\circ} 50' N.$ , long.  $114^{\circ} 11' E.$ , and shown as being 3 or 4 miles in extent.

Ganges reef, 32 miles to the northward of Cornwallis south reef, is charted in lat.  $9^{\circ} 22' N.$ , long.  $114^{\circ} 11' E.$

Sin Cowe island, 22 miles north-eastward of Ganges reef, in lat.  $9^{\circ} 42' N.$ , long  $114^{\circ} 22' E.$

Fancy Wreck shoal, 18 miles eastward of Sin Cowe island, in lat.  $9^{\circ} 43' N.$ , long.  $114^{\circ} 41' E.$

Cornwallis reef is shown on the chart as an extensive reef with rocks, about 16 miles northward of Sin Cowe island, in lat.  $10^{\circ} 0' N.$ , long.  $114^{\circ} 23' E.$

Pennsylvania shoal, one of a number of that name, is placed in lat.  $10^{\circ} 0' N.$ , long.  $115^{\circ} 10' E.$ ; and about 20 miles N.N.W. of it, in lat.  $10^{\circ} 18' N.$ , long.  $115^{\circ} 4' E.$ , is another doubtful Ganges reef. About 14 miles N.N.E. of this latter, in lat.  $10^{\circ} 32' N.$ , long.  $115^{\circ} 8' E.$ , is Ganges North reef.

**Third Thomas shoal** (1839) is placed on the chart in lat.  $10^{\circ} 52' N.$ , long.  $115^{\circ} 55' E.$

Two reefs marked *Mischief*, 1861, are charted about 25 and 58 miles southward of Third Thomas, the second being about 10 miles from Second Thomas shoal.

**Flat island** is said to be low and flat, surrounded with breakers, and having a reef projecting from its north-east side. It is reported to have been seen by several vessels. See page 250.

No dangers are charted northward of Flat island, though a pecked line is marked on the chart some 30 miles beyond it, within which distance it is not recommended to navigate until the locality has been surveyed.

It is reported that numerous dangers exist in the space between Flat island and Trident shoal. (See page 116.)

#### WEST COAST OF PALAWAN, *continued from page 240.*

##### ULUGAN BAY TO NORTH EXTREME OF PALAWAN.

**COAST.—ST. PAUL'S BAY.—Aspect.**—Eastward of cape Sangbauen, the north-eastern point of Ulugan bay, and separated from it by a low wooded valley, is mount Blomfield, table land upwards of 2,000 feet in height, with several nipples on the summit, and steep watercourses down the side, terminating in a bold barren-looking coast, immediately to the eastward of which is St. Paul's bay.

Overlooking the bay on the south are some dome-shaped hills and perpendicular cliffs of limestone formation, the most conspicuous of which is St. Paul, 3,370 feet in height, from which the bay derives its name.

Chart, 2,912  
[2,854].  
Var. 1° E.

Eastward of this is a range, named by the old navigators the Four peaks, of which Cleopatra's needle, 5,200 feet in height, is the southernmost and highest.

The northern termination of the range is abrupt, and there is a high round-topped hill lying almost immediately under, between it and the coast.

**Cliff head**, 9 miles north-eastward of cape Sangbauen, and forming the north-eastern extremity of St. Paul's bay, is a long wooded promontory, terminating in a steep cliff 350 feet in height. A smaller head, with a rocky islet on its north side juts out into the bay immediately southward of it, one mile to the south-westward of which is a rock awash, with 5 to 9 fathoms water close-to.

The shore of St. Paul's bay is bold to approach, having 7 fathoms near the points, and from 12 to 16 fathoms (fine sand and shells) in the centre.

Lat.  $10^{\circ} 20' N.$   
Long.  $118^{\circ} 59' E.$

**JIBBOOM (Tibbven) BAY**, the entrance to which lies between Cliff head and Peaked point  $4\frac{1}{2}$  miles northward of it, has a group of islands and rocks near the centre; Bay island, the largest, has a flat summit, 307 feet above the sea. Abreast this group on the south side of the bay is Long point, with deep sandy bays on either side, and a hill (2,015 feet high), with a nipple shoulder at the back. The depths in the centre of Jibboom bay are 12 to 15 fathoms, and 5 fathoms at its head. The inlet on the south-east side of the upper part of the bay is shallow. A shoal with a depth of 3 fathoms lies half a mile from the eastern shore at three-quarters of a mile northward of Chawat point.

Shelter from north-east winds will be found in 15 fathoms about three-quarters of a mile south-eastward of Bay island group, with Zoe, the easternmost islet, and Peaked point the northern extremity of the bay, in line. There would be more shelter for a steam vessel nearer the head of the bay. The channel northward of the group is a mile wide, with a depth of about 15 fathoms.

**The Depths** northward of Ulugan bay, and off this part of the coast, vary from 17 to 50 fathoms, chiefly sand bottom, except those under 30 fathoms, when it is usually coarse sand and shells, or broken coral.

**The COAST** from Peaked point (which has a detached rock, about 100 feet high close off it) trends  $2\frac{1}{2}$  miles northward to a steep bold point, named Amalingat, at the foot of which lies Ninepin rock, with a reef awash half a cable westward of it.

Off the next point north-eastward are the two islands Kakbolo and Kabalas, which form the western side of May-day bay.

Kakbolo island lies  $1\frac{3}{4}$  miles from the shore, and is separated from Kabalas by a channel two-thirds of a mile wide. It has two peaks of nearly equal elevation, about 400 feet, and a sandy bay on the eastern

side. The north and west faces are bold steep cliffs, and close off the north-east extreme of the island is a reef awash. Chart, 2,912  
[2,664].  
Var. 1° E.

Kabalas or Katalat island, the larger of the two,  $1\frac{1}{2}$  miles in length, has a clump of trees near the summit, and is connected with the mainland by a ledge on which are two pyramidal rocks.

**MAY-DAY BAY**, immediately eastward of Kabalas and Kakbolo islands, affords good shelter in the south-west monsoon, and is by far a more convenient anchorage for wooding and watering than any of those we have described to the southward on this side of Palawan. Lat. 10° 25' N.  
Long. 119° 2' E.

It is  $3\frac{1}{4}$  miles wide at the entrance, between Kakbolo and Kaknipa islands,  $5\frac{1}{2}$  miles in length, and is formed on the eastern side by a long irregular-shaped promontory, the continuation of a high range jutting out in a northerly direction from the island.

Kaknipa or High island lies off the extremity of the promontory, and is separated from it by a channel 4 cables wide, in which is Passage reef, with rocks about 6 feet high on it. The island is steep and bold, 1,050 feet high and  $3\frac{1}{3}$  miles in circumference, with two peaks, the southern being the higher. There is a thumb rock off the south-western point, and a peaked rock 3 cables from the northern shore of the island.

In the south-eastern part of May-day bay is Conical head, with deep sandy bays on either side. The bay on the north side has from 14 to 20 fathoms, while that on the south side has from 17 to 20 fathoms at the entrance; some streams of fresh water discharge through the beach.

The depths at the entrance of May-day bay are 25 to 27 fathoms, sand and mud, gradually decreasing to 19 fathoms close to Conical head. The points in the bay appear to be steep-to, and there is no known danger in it but what shows.

**Water.**—The watering place is at the head of a cove, named Watering bay, in the south-west corner. There is good anchorage in 19 fathoms off the entrance, midway between it and Conical head, with the eastern sides of Kabalas and Kakbolo islands in line. The fresh-water stream falls from the rocks on the south side of the cove, where, at half tide, a boat can almost go under it.

**Tides.**—It is high water, full and change, in May-day bay at 9h. 55m.; springs rise  $3\frac{1}{2}$  feet.

**BOAYAN ISLAND**, lying 3 miles north-eastward from Kaknipa island, is an irregular-shaped island 910 feet in height, nearly 5 miles in length east and west, and  $3\frac{1}{2}$  miles in breadth in one place, but in some parts is less than half a mile. Its north-western extremity terminates in a bold head, with a double peak 725 feet in height;\* and the shore all around, except on the south side, partakes of somewhat similar features. Lat. 10° 35' N.  
Long. 119° 7' E.

Chart. 2,912  
1:20,654.  
Var. 1<sup>8</sup> E.

Shelter from south-west winds will be found on the north-east side of Boayan, in about 15 fathoms, at three-quarters of a mile northward of Broughton point, the eastern extreme of the island.

Two islands lie from 3½ to 4 cables off Bluff point, the south-west extreme of Boayan; Saddle island, the southernmost, has a reef awash between it and the point, and also some peaked rocks extending 2 cables from its south-eastern side. Lump island, the northernmost, is abrupt and has two islets inshore of it.

**Royalist shoal**, composed of coral with 2½ fathoms over it, lies S.E. by E.  $\frac{3}{4}$  E. one mile from Saddle island, with the summit of Kabalns open of the south-eastern side of Kaknipa island bearing S.W.  $\frac{1}{8}$  W.

**Boayan reef**, awash, lies 2 cables from the southern coast of Boayan island, and E. by N.  $\frac{5}{8}$  N., nearly 3 miles from Saddle island. There is a depth of 24 fathoms at 2 cables south of this reef.

**Albaguen island**, lying 2½ miles southward of Boayan, is 570 feet high, and nearly 1½ miles in length, with a conspicuous red stripe (land-slip) on the north-west side, close to which, and connected to the island by a small isthmus, is a conical head named Isthmus cone.

**PORT BARTON.**—Albaguen island is the extreme and largest of a group of islands stretching in a north-westerly direction from the eastern shore across the mouth of a deep bay, and which, together with the promontory forming the eastern side of May-day bay, encloses a spacious sheet of water, to which the name of port Barton has been given; it affords shelter in both monsoons.

Lat. 10° 29' N.  
Long. 119° 7' E.

The entrance to port Barton is between Riddle and Bubon points, the latter being in the position given. From the entrance, the harbour extends 5½ miles in a southerly direction, and near its head is Endeavour island, having Wedge islet lying off its south-eastern face, half-way to the shore. There is, however, nothing to induce vessels to go beyond Middle reef, nearly 3 miles within the entrance, the harbour affording no good watering place, although there are several streams in the mangroves bordering the shore, which is apparently rocky in that direction. The depths in the entrance of the harbour are about 25 fathoms, mud, decreasing gradually to 5 and 6 fathoms close to the edges of the reefs which fringe the shore at the head of it.

**Queen's bay.**—South, 1½ miles from Bubon point, is Oyster point, and between is Queen's bay, overlooked by Queen's bay peak (1,030 feet); its shore is fringed with coral, extending from one to 2 cables off, with deep water close to the edge.

**Kapsalai, Double and Regatta islands.**—Kapsalai, the inner and next island in point of size to Albaguen, of the group forming

the north-eastern side of port Barton, is connected with Kakamatakan point [Chart. 2,912.  
2,654]. on the mainland by a reef almost dry at low water; South, 4 cables from Var. 1° E. the extreme of the island are two rocks awash, with 6 fathoms close-to.

At less than a cable from the western extreme of Kapsalai is Double island nearly half a mile in length, the south side of which is foul to the distance of a cable. North-west of Double island, and separated by a channel 1½ cables wide, with 6 feet water in it, is Regatta island, nearly one-third of a mile in extent.

**Kapsalai reef,** a coral patch one cable in extent, and nearly awash at low water, lies half a mile southward of the western summit of Double island, with Riddle point in line with the south-west extreme of Regatta island, and Oyster point in line with Queen's bay peak.

**Middle reef,** 2 cables in extent, and awash at low water, lies S.W. ½ S. nearly 1½ miles from Kapsalai reef, and the same distance S.E. ½ E. of Oyster point. At 7 cables E.S.E from Middle reef there is a coral shoal of 1½ fathoms; from this the ground appears more or less rocky in an easterly direction to the shore.

**Anchorage.**—If requiring shelter only, in port Barton, and in the south-west monsoon, anchor in the northern part of the bay in 20 fathoms, stiff mud, with Queen's bay peak bearing about S.W. ½ W., and Bubon point North, with Saddle island just shut in; here a vessel will be landlocked. In north-east winds, vessels wishing to seek closer shelter for repairs, &c., will find good anchorage in 12 fathoms, mud, farther eastward, south of Kapsalai island, care being taken in approaching it to avoid Kapsalai reef.

**Tides.**—It is high water, full and change, at port Barton at 10h. 55m.; springs rise 6 feet.

**Coast.**—At 2½ miles north-eastward of the south end of Kapsalai island is Betbet point, with a conical hill near, and an islet of the same name off it, from which a coral spit projects nearly two-thirds of a mile in a W.N.W. direction.

The coral reef extends nearly one-third of a mile from the shore on the north side of Kapsalai island, and nearly two-thirds of a mile in a northerly direction from Kakamatakan point on the mainland abreast, with 9 to 13 fathoms close to the edge.

**PAGDANAN BAY.**—At two-thirds of a mile in a north-easterly direction from Betbet point is Reef point, between which and Pagdanan peninsula is Pagdanan bay, 2½ miles wide at the entrance, and about the same in length. The Pagdanan hills rise to the height of about 2,000 feet at the back of the bay.

Lat. 10° 31' N.  
Long. 119° 13' E.

Chart. 2,912  
[2,654].  
Var. 1° E.

**Reefs** lie off the points in the bay, some to the extent of half a mile.

**Water.**—A fresh-water stream discharges at the foot of Green head in Pagdanan bay; and there are also two others in the south part near Squall point.

**Directions.—Anchorage.**—The depths in the north-western entrance to the bay southward of Boayan island average about 24 fathoms, mud; in the bay there are 10 to 12 fathoms. Vessels not wishing to go into port Barton will find good shelter from south-west winds to the northward of Kapsalai island; and from north-east winds in Pagdanan bay. Approaching either anchorage from the westward, care must be taken not to bring the southern peak of Saddle island to the westward of N.W. by W. till the highest part of Kabalas island is seen in the centre of the passage southward of Kaknips island, about S.W.  $\frac{1}{4}$  W., to avoid Royalist shoal.

No directions have been written for the north-eastern entrance, described below, but there seems no difficulty in entering it in a steam vessel, observing that the peak of Kaknipa or High island just open south of Niaporai island, bearing W.S.W., leads clear southward of Pagdanan rock, and that Niaporai island may be passed at the distance of one to 2 cables. If entering south of Niaporai rock, Confusion rock may be rounded at from 2 to 3 cables, when Queen's bay peak over the north end of Savage island will lead in clear of Niaporai rock.

**Pagdanan point**, the northern extreme of the bay, is a peninsular head of reddish aspect; Confusion rock, white, and about 40 feet high, lies 3 cables N.W. from it; immediately to the southward of this point is an extensive land-slip, and a double island almost connected with the shore at low water.

Lat. 10° 34' N.  
Long. 119° 10' E.

**Niaporai island and rock.**—Niaporai island, 354 feet in height, lies in the channel between Pagdanan point and Boayan island, at half a mile from the latter; and S.E. by E. half a mile from the nearest point of Niaporai, is the southernmost of two rocks, which lie nearly in the centre of the channel. There is a depth of 1½ fathoms over Niaporai rock at low water, with from 4 to 12 fathoms in the immediate neighbourhood surrounding it on either side. From this rock Queen's bay peak is in line with the south-eastern extreme of Albaguen island bearing S.W.  $\frac{1}{8}$  W.

There is also a 2½-fathoms patch, lying E.N.E. half a mile from the summit of Niaporai island, with 4 to 5 fathoms close to, and another patch of 4 fathoms about midway between the island summit and Broughton point.

**Pagdanan rock**, the northernmost of the two rocks in the north-eastern channel, has  $2\frac{1}{2}$  fathoms on it, with depths of 7 to 10 fathoms close to, and lies N.E. by N. one mile from the Niaporai rock, with Confusion rock in line with the western extreme of Pagdanan peninsula, and the eastern extreme of Niaporai island nearly in line with the sharp conical head joining Albaguen island.

**IMURUAN BAY** between Boayan island and Emergency point, is about 12 miles wide at the entrance. Its eastern shore is backed by a high range of hills, of which Bay peak, abreast of Imuruan island, is the most conspicuous.

From the low neck of Pagdanan peninsula the shore of the bay for  $8\frac{1}{2}$  miles is almost one continuous sand beach, with small rocky heads here and there, the two southernmost having each a rock above water off them. The coast thence is bold and rocky for about  $2\frac{1}{2}$  miles, beyond which is a sandy beach for 3 miles, thence to Emergency point, the shore is rocky. The shore nearly throughout the bay is bold to approach, having 3 to 5 fathoms close to the beach. At the entrance the depths vary from 20 to 30 fathoms, mud.

**Anchorage.**—Shelter from north-east winds will be found in the bay eastward of Emergency point, in depths of 7 to 10 fathoms, mud; a tolerably good supply of fish may be obtained with the seine, on the sandy beaches abreast.

A group of rocks above water lies E.  $\frac{1}{2}$  S., about  $1\frac{1}{2}$  miles from Emergency point; and there is a rock awash at 2 cables north-east of the group.

**Wedge island (Maninbulao)**, at the entrance of Imuruan bay,  $4\frac{3}{4}$  miles south-westward of Emergency point, is small, wedge-shaped, 180 feet in height, and thickly wooded.

**Bay islands.**—Imuruan the larger of the two is 500 feet in height and one mile in length, with a reef extending 3 cables from the eastern side, between which and the shore there is a channel  $1\frac{1}{4}$  miles wide, with depths of 4 to 7 fathoms water in it. Lampinigan is a small island situated about 2 cables westward of Imuruan.

**MOUNT KAPOAS**, 16 miles north-eastward from Boayan island, is table land, 3,350 feet in height, with a high and a low sharp nipple at the western shoulder, and a conspicuous land-slip extending two-thirds of the way from the summit to the base, immediately under it. The table part is a sharp uneven ridge extending one mile in an east and west direction, from which the land falls suddenly on all sides.

The mount rises near the south-western extremity of an extensive peninsula, which, on the north, forms part of the secure and capacious sound of Malampaya, and on the south, the bay of Imuruan.

Charts. 2,912  
[2,654], 2,911  
[2,655].  
Lat.  $10^{\circ} 51' N.$   
Long.  $119^{\circ} 12' E.$   
Var.  $1^{\circ}$  E.

**CAPE KAPOAS**, situated 7 miles north-westward of Emergency point, is a bold projecting headland with two peaks, and the extreme western point of the peninsula on which mount Kapoas is situated.

**Conflagration hill island**, is situated 2 miles south-eastward of cape Kapoas, near one of the points of the several bays with which the coast is indented; it is a steep conical island, connected with the shore at low water, with a small head, similar in feature, but of whitish aspect forming its south extreme. It is named Conflagration hill from an accident having occurred there, which proved fatal to one man, and nearly so to an officer and part of a boat's crew who were ascending it for the purpose of making observations, in consequence of the long grass having been inadvertently set on fire, the flames of which spread so rapidly as to overtake them before they reached the summit.

Shelter from north-east winds may be found in the first bay eastward of the island, westward of Low Kapoas, a peak 1,560 feet in height. A rocky cliff in the centre of the bay divides the sand beach; from this head a reef awash extends nearly 4 cables in a south-westerly direction, with 4 fathoms close to the edge.

There are three smaller bays between the island and Enterprise point southward of cape Kapoas, as will be seen on the plan.

Northward of cape Kapoas for 6 miles to Diente point, the south-western point of the entrance of Malampaya sound, the coast is deeply indented, the heads of some of the bays being separated from those corresponding to them on the opposite side of the peninsula and in Malampaya sound, by very narrow isthmuses.

Lat.  $10^{\circ} 53' N.$   
Long.  $119^{\circ} 13' E.$

**INLULUTOK BAY**, the largest of these bays, is  $1\frac{1}{2}$  miles wide in the entrance, and  $2\frac{1}{4}$  miles in length; it lies nearly midway between Kapoas and Diente point, and affords good shelter in the north-east monsoon. On its north side is Saddle hill, 1,000 feet in height, which, together with Chinongab peak 2 miles within it, form conspicuous objects to identify the locality. There are no dangers known in any of these bays but what are visible. The bights and some of the points are fringed with coral, the edges of which can generally be discerned by keeping an ordinary lookout. The outer coast is bold, rocky, and precipitous in some places, with deep water close-to.

Wreck head, a bold rocky cliff, forms the north point of Inlulutok bay.

**Anchorage.—Water.**—There is good anchorage in Inlulutok with offshore winds (the only eligible bay for vessels to enter) on the north shore, between Teodore point and Anchorage island, in a depth of 15 to 16 fathoms, mud, with Saddle hill bearing about N. by W.

In the bay north of the anchorage and at the foot of Saddle hill are two streams of fresh water. The shore, however, is difficult of access,

owing to the coral fringing the bay, which off Teodore point extends half a cable.

Chart. 2,911  
[2,655]  
Var. 1<sup>3</sup> E.

**Cape Ross.**—In the bay northward of Wreck head between it and cape Ross, under Saddle hill is a conspicuous land slip.

Cape Ross or Tabonan is the western extreme of the ridge extending from Diente hill.

**MALAMPAYA SOUND**, formed on the north-eastern side of the peninsula of Kapoas, is about 19 miles in length in a south-easterly direction varying in breadth from 2 to 4½ miles. It is one of the finest harbours that can be desired, being almost free from sunken dangers, and containing along its shores bays and inlets capable of affording shelter to a large number of vessels of deep draught. The entrance is occupied by Tuluran island, with a channel 6 cables wide southward of it named Blockade strait; Endeavour strait, the channel eastward of the island, is only 1½ cables wide in places and is shallow.

At about 4 miles within Blockade strait the sound is contracted by long projecting headlands from either shore, forming a second strait (containing several islands), which opens into an expanse of water 9 miles in length and 4 miles in width, named the Inner sound, with depths of 6 to 9 fathoms, mud, in the deeper portion; here are the settlements of Pankol and Banlao.

**Blockade strait**, the channel southward of Tuluran, is about 6 cables wide in its narrowest part, with 20 to 30 fathoms in the fairway; within this part the strait is about a mile wide for 1¼ miles, with depths of 14 to 20 fathoms, whence it opens into the outer portion of Malampaya sound, where there are depths of 14 to 15 fathoms. Besides Entrance rock and White Round islet, there are other small islets and rocks above water in the entrance, and on the south side of the narrow part of the strait.

**Directions**, see pages 264 and 265.

**Islands and Dangers.**—**Diente point**, the north-western extremity of Kapoas peninsula, is the western limit of the principal channel leading to Malampaya sound. Notch islet, 176 feet in height, lies off its north-east extreme, and at 1½ cables northward of the islet is a reef of rocks awash, with a rock 15 feet high on it.

**Tuluran island**, on the east side of the main entrance of Malampaya sound, is 4½ miles in length, north and south, and 1½ miles in breadth. Two sharp peaks attaining a height of 1,272 feet and 1,267 feet, lie near the centre of the island, and there are several other peaks of considerable elevation on it; Tuluran Table, the southernmost, being 1,033 feet above the sea, and not unlike mount Kapoas. The northern and western sides

Lat. 10° 56' N.  
Long. 119° 12' E.

Lat. 10° 57' N.  
Long. 119° 16' E.

Chart. 2,011  
[2,655].  
Var. 1° E.

are bold, rocky, and precipitous in some parts, with conspicuous water-courses here and there.

At the north-western point of the island is a remarkable peaked islet, with two rocks awash at a cable north-west of it.

**Entrance and Pillar rocks.**—Nearly two-thirds of a mile north-north-eastward from Notch islet, off Diente point, is a cluster of small rocks nearly 2 cables in length, with depths of 16 to 20 fathoms close-to. Pillar rock, 30 feet high, is the westernmost, and Entrance rock the easternmost.

Lat. 10° 59' N.  
Long. 119° 14' E.

**White Round islet and Pyramid rocks** lie off the western side of Tuluran island. White Round islet is small, 80 feet high, and lies W. by N. nearly 1½ miles from Bold head on Tuluran island.

Pyramid rocks are 50 feet high, and one quarter of a mile in extent; the highest rock lies N.N.E. nearly 2 miles from White Round islet.

The passage is safe between White Round islet and Pyramid rocks, but between the latter and Peaked islet there is a coral patch with one fathom water on it, N.E. ½ N. one-quarter of a mile from the highest Pyramid rock.

**Cone islet and Largon rocks.**—A conical islet, 237 feet high, lies in the approach to Bolalo bay on the south shore of Blockade strait. At 3 cables N. by W. ¼ W. from Cone islet, is Largon islet, 130 feet high, from which rocks above water extend 4 cables northward. Largon rock the northernmost is 13 feet high.

**Bolalo bay**, on the southern shore of Blockade strait, is a deep inlet affording good shelter from south-west winds. It is 2½ miles deep in a southerly direction, and about half a mile wide, the head being separated by a narrow isthmus from the north part of Iululutok bay.

**Chinongab**, a sharp peak 1,216 feet high, with a small table ridge, lies within the eastern shore of this bay.

The southern shore of Blockade strait within Parmidiaran point forms a bay, the south-easternmost point of which has a reef awash, extending nearly a cable off and steep-to. White rock lies about midway between the points of the bay, with 16 fathoms water close outside it.

Lat. 10° 58' N.  
Long. 119° 17' E.

**Endeavour strait**, to the eastward of Tuluran island, has its southern entrance between Pillar rock point and Endeavour point, and is rather more than three-quarters of a mile wide. The strait runs nearly north and south, and is (including the passage inside a chain of islets and needle rocks, with numerous reefs awash, extending nearly 2 miles in a northerly direction from the north-east point of Tuluran) 6 miles in length, and barely a cable wide in the narrowest part.

Endeavour strait ought not to be used by sailing vessels, as the winds are baffling, especially in the Narrows, from the high land on either side.

Coral fringes the shore on either side of the strait, and nearly in the centre of a bay,  $3\frac{1}{2}$  cables north of Exertion point on the west shore, is a rock awash at low water with 10 to 12 fathoms around.

The depths at the southern entrance of the strait are 19 and 20 fathoms, decreasing gradually to 9 and 10 fathoms towards the Narrows, where are 4 to 5 fathoms, mud.

There is a snug cove at the head of an inlet nearly a mile deep close northward of Endeavour point.

**Pirate bay.**—Between Blockade strait and the second or inner entrance, the western shore of Malampaya sound has three deep bays, in each of which the ground is quite clear, and shelter is afforded from all winds; but the two southern bays have no watering places. The shore on the opposite side, except in fine weather, has generally a little swell breaking on it, setting directly in through Blockade strait, and in the bay under the high land in the north-east corner, are some islands and white rocks.

Pirate bay, the northernmost of the three bays just mentioned as being on the western shore, will be found the most convenient to vessels merely requiring shelter, wood, or water; it is about three-quarters of a mile in extent, and its shores are clear all round at half a cable off. The depths are about 14 fathoms in the middle, stiff mud, and 7 to 9 fathoms close to the head of the bay.

**Water.**—The watering place, affording a good supply, is at the south-west head of the bay.

**Tenabian island**, 325 feet high, is triangular in shape and about two-thirds of a mile in length. The passage westward of the island is 2 cables wide, but reduced to half that width by the reef which extends from the islands. Bay rock, above water, lies  $1\frac{1}{2}$  cables off the south side of the island.

**Malapina island**, lying a mile to the eastward of Tenabian, near the fairway, is small and 156 feet in height.

**Boat rock** lies just in the entrance of North-east bay,  $1\frac{1}{4}$  miles eastward of Malapina island. The ground is somewhat foul for  $1\frac{1}{2}$  cables west-south-westward of this rock. North-east bay island, Crane, Janet, and other islets, lie in North-east bay.

**Inner strait.—Takbolo island.**—In the inner strait which is Lat.  $10^{\circ} 53' N.$   
Long.  $119^{\circ} 19' E$   $3\frac{1}{2}$  miles in length in a south-easterly direction, and about  $2\frac{1}{2}$  miles wide, are several islands, the north-westernmost of which is Takbolo, 300 feet in height, and nearly a mile in length, in the fairway. Westward of it and of Passage island is the principal passage leading into Inner sound.

**Kalabuktung islets.**—Between the north point of Takbolo, and the headland on the east side of the strait is the large Kalabuktung islet,

Chart. 2,911  
[2,655].  
Var. 1° E.

are bold, rocky, and precipitous in some parts, with conspicuous water-courses here and there.

At the north-western point of the island is a remarkable peaked islet, with two rocks awash at a cable north-west of it.

**Entrance and Pillar rocks.**—Nearly two-thirds of a mile north-north-eastward from Notch islet, off Diente point, is a cluster of small rocks nearly 2 cables in length, with depths of 16 to 20 fathoms close-to. Pillar rock, 30 feet high, is the westernmost, and Entrance rock the easternmost.

Lat. 10° 59' N.  
Long. 119° 14' E.

**White Round islet and Pyramid rocks** lie off the western side of Tuluran island. White Round islet is small, 80 feet high, and lies W. by N. nearly 1½ miles from Bold head on Tuluran island.

Pyramid rocks are 50 feet high, and one quarter of a mile in extent; the highest rock lies N.N.E. nearly 2 miles from White Round islet.

The passage is safe between White Round islet and Pyramid rocks, but between the latter and Peaked islet there is a coral patch with one fathom water on it, N.E. ¼ N. one-quarter of a mile from the highest Pyramid rock.

**Cone islet and Largon rocks.**—A conical islet, 237 feet high, lies in the approach to Bolalo bay on the south shore of Blockade strait. At 3 cables N. by W. ¼ W. from Cone islet, is Largon islet, 130 feet high, from which rocks above water extend 4 cables northward. Largon rock the northernmost is 13 feet high.

**Bolalo bay**, on the southern shore of Blockade strait, is a deep inlet affording good shelter from south-west winds. It is 2½ miles deep in a southerly direction, and about half a mile wide, the head being separated by a narrow isthmus from the north part of Iululutok bay.

**Chinongab**, a sharp peak 1,216 feet high, with a small table ridge, lies within the eastern shore of this bay.

The southern shore of Blockade strait within Parmidiaran point forms a bay, the south-easternmost point of which has a reef awash, extending nearly a cable off and steep-to. White rock lies about midway between the points of the bay, with 16 fathoms water close outside it.

Lat. 10° 58' N.  
Long. 119° 17' E.

**Endeavour strait**, to the eastward of Tuluran island, has its southern entrance between Pillar rock point and Endeavour point, and is rather more than three-quarters of a mile wide. The strait runs nearly north and south, and is (including the passage inside a chain of islets and needle rocks, with numerous reefs awash, extending nearly 2 miles in a northerly direction from the north-east point of Tuluran) 6 miles in length, and barely a cable wide in the narrowest part.

Endeavour strait ought not to be used by sailing vessels, as the winds are baffling, especially in the Narrows, from the high land on either side.

Coral fringes the shore on either side of the strait, and nearly in the centre of a bay,  $3\frac{1}{2}$  cables north of Exertion point on the west shore, is a rock awash at low water with 10 to 12 fathoms around.

The depths at the southern entrance of the strait are 19 and 20 fathoms, decreasing gradually to 9 and 10 fathoms towards the Narrows, where are 4 to 5 fathoms, mud.

There is a snug cove at the head of an inlet nearly a mile deep close northward of Endeavour point.

**Pirate bay.**—Between Blockade strait and the second or inner entrance, the western shore of Malampaya sound has three deep bays, in each of which the ground is quite clear, and shelter is afforded from all winds; but the two southern bays have no watering places. The shore on the opposite side, except in fine weather, has generally a little swell breaking on it, setting directly in through Blockade strait, and in the bay under the high land in the north-east corner, are some islands and white rocks.

Pirate bay, the northernmost of the three bays just mentioned as being on the western shore, will be found the most convenient to vessels merely requiring shelter, wood, or water; it is about three-quarters of a mile in extent, and its shores are clear all round at half a cable off. The depths are about 14 fathoms in the middle, stiff mud, and 7 to 9 fathoms close to the head of the bay.

**Water.**—The watering place, affording a good supply, is at the south-west head of the bay.

**Tenabian island**, 325 feet high, is triangular in shape and about two-thirds of a mile in length. The passage westward of the island is 2 cables wide, but reduced to half that width by the reef which extends from the islands. Bay rock, above water, lies  $1\frac{1}{2}$  cables off the south side of the island.

**Malapina island**, lying a mile to the eastward of Tenabian, near the fairway, is small and 156 feet in height.

**Boat rock** lies just in the entrance of North-east bay,  $1\frac{1}{2}$  miles eastward of Malapina island. The ground is somewhat foul for  $1\frac{1}{2}$  cables west-south-westward of this rock. North-east bay island, Crane, Janet, and other islets, lie in North-east bay.

**Inner strait.—Takbolo island.**—In the inner strait which is Lat.  $10^{\circ} 53' N.$   
Long.  $119^{\circ} 19' E$   $3\frac{1}{2}$  miles in length in a south-easterly direction, and about  $2\frac{1}{2}$  miles wide, are several islands, the north-westernmost of which is Takbolo, 300 feet in height, and nearly a mile in length, in the fairway. Westward of it and of Passage island is the principal passage leading into Inner sound.

**Kalabuktung islets.**—Between the north point of Takbolo, and the headland on the east side of the strait is the large Kalabuktung islet,

Chart, 2,911  
[2,665]  
Var. 1° E.

and at one-third of a mile to the westward of it, is the smaller islet of the same name.

**Passage, Eniaran, and Durangan islands.** — Passage island, the largest in the strait, is 3 miles in circumference, and is separated from the south-east point of Takbolo by a channel one cable wide, with 5 fathoms water, and from Tuluan hill, the middle point on the eastern shore, by a boat channel three-quarters of a cable wide.

Eniaran islet, with a flat rock on its west side, lies close off the western point of Passage island, and off the western point of a bay on the south side of the latter island is Balolo rock. Rocks extend a quarter of a mile westward of Balolo rock, terminating in Kansea rock, awash at low water and steep-to.

Durangan, a round island, 386 feet high, and half a mile in length, with two small black rocks at the eastern extremity, occupies the centre of the channel between the south-west side of Passage island and Balulu point on the western shore.

The channel between Passage and Durangan islands is 3 cables wide ; Kansea rock is the only danger known that is not visible.

Southward of Durangan island the channel is about the same width and has depths of 9 to 12 fathoms, mud; nearly in the centre is Kalonhogon, the westernmost of two small islands 4 cables apart; Bartok, the easternmost, has a reef extending half a cable from both extremes.

Lat. 10° 51' N.  
Long. 119° 20' E.

**Mallarotone and Ibelbel islands.** — Nearly a mile south-eastward of Durangan, is Mallarotone island, nearly half a mile in length, with an average breadth of about 200 yards. A pillar rock lies nearly a cable off its south-west point.

Ibelbel island, about 200 yards in diameter, lies south-eastward of Passage island with a clear channel between.

**Vinalo island**, eastward of Ibelbel island and near Balauan point on the eastern shore, is about 300 yards in length.

**Mallarois island**, 93 feet in height, is less than 200 yards in length, and has a precipitous cliff on the south side with some rocks detached from the east end; it lies southward of Vinalo.

The channel between Mallarois and Vinalo island north of it, is 2 cables wide, and said to be safe.

**Damao island**, the southern limit of the inner strait, is 226 feet high, nearly three-quarters of a mile in length, and 3 cables from the scuthern shore; a peaked islet, 83 feet high, lies off its northern extremity. In the channel separating Damao island from the shore are islets and rocks awash.

**Alligator bay** is the northernmost of two large bays on the southern side of the inner strait, and, next to Pirate bay, the most convenient place in the sound for watering. Alligator island lies towards the head of the bay, south of the watering place, and to the south-eastward of it is a double cone island.

The depths at the entrance of the bay are 10 to 12 fathoms, mud, decreasing gradually to 3 and 4 fathoms near the shore.

**Water.**—In the south-east corner of the bay the main stream from mount Kapoas discharges itself through some low ground, but the watering place is on the north shore of the bay, in the first small indentation westward of Green head.

**Malipu bay** is separated from Alligator bay by the chain of hills of which Balulu point is the northern extremity, and it has its eastern limit at Damao island. Hunch hill, 454 feet high, lies on the south-eastern side of the bay, and near the western shore is Chinikaran island, with an isthmus head on the north face; the passage between the island and the shore is shallow.

The depths in Malipu bay range from 6 to 8 fathoms decreasing gradually to 2 fathoms towards the shores of the bay.

**Inner sound.—Pankol.**—The Inner sound of Malampaya opens immediately southward of Damao and Mallarois islands, and in a bay on the northern side is the settlement of Pankol, prettily situated under the high land, and fronted by a green isolated hill, 65 feet high, on which is built a stockade. The natives are friendly, and for supplies it is one of the best places on the coast. A stream of fresh water runs on either side of the stockade hill, and water can be procured, but not readily in ships' boats. Fish is plentiful.

Vessels can anchor off Pankol in 3 fathoms, stiff mud, within a quarter of a mile of the stockade, or in deeper water farther off, as convenient, the anchorage being safe in all seasons.

The average depth in the centre of Inner sound is  $6\frac{1}{2}$  fathoms, mud, from which it shoals gradually on all sides, except towards the entrance, where it deepens.

**Malampaya river** discharges into a shallow bay on the eastern side of the sound 3 miles from Pankol. A high round island named Malutone, with an island on either side, lies across the entrance of this bay, leaving a channel into it of little more than 2 cables width, with a depth of 2 fathoms. Across the entrance of the river is a line of stakes commanded by a small stockade. At low water the mud dries considerably outside this, to nearly abreast of two small islands on the south side of the bay.

Chart. 2.911  
[2,655].  
Var. 1° E.

Lat. 10° 46' N.  
Long. 119° 26' E.

The river, which is navigable for boats about 2 miles, trends in a south-easterly direction; near its head is a good foot-path leading to the village of Tai Tai, on the opposite side of the island, a distance of 2 to 3 miles only.

**Baulao**, a settlement similar to that of Pankol, lies on the eastern shore near the head of the sound,  $6\frac{1}{2}$  miles from Pankol. It cannot, however, be approached within 2 miles by a vessel of more than 12 feet draught, as the water shoals gradually from 3 fathoms at 4 miles southward of Pankol, towards the head, where, at low water, the mud dries out nearly to Bay islet, or a mile from the mangroves.

Immediately southward of Baulao, the hills at the head of the sound on either side recede, and are separated by a large plain which extends through the island, almost to the opposite coast, some of the water from which is discharged into Malampaya sound by a river having its outlet through the mangroves, close to Bush head, nearly 3 miles South of Baulao.

The western shore of the sound to the southward of Damao island is indented by bays, all of which are shallow.

**Doubtful danger.**—In an old MS. chart, which was seen at Tai Tai, there is a rock named Koloma laid down nearly in the centre of Inner sound. The late Captain Bate tried for three consecutive days to find it, without success, and the people of Pankol and Baulao denied having any knowledge of its existence. As near as could be ascertained from the Spanish chart, the position of the rock is about 3 miles S.  $\frac{1}{2}$  E. of Pankol stockade.

The northern extremes of Mallarotone and Durangan islands in line, will keep a vessel northward of this position.

**Tides.**—It is high water, full and change, at Pankol at 9h. 40m.; springs rise 6 feet.

**Directions.**—There is no difficulty in a steam vessel proceeding to the head of Malampaya sound. In making the entrance from the westward, Notch islet\* off Diente point shows conspicuously. White Round islet will be seen, and on a closer approach, Entrance and Largon rocks, become visible. The best course is between these rocks and White Round islet, the depths in the neighbourhood of which average about 30 fathoms. In a sailing vessel, with a southerly wind, Largon rocks should be kept close aboard to fetch through Blockade strait and to prevent being set over upon the northern shore by shifts of wind from the high land about Chinongab. Having passed Parmidiaran point, proceed northward of White rock in the next bay; the reef awash off the point under Look-out hill, having 13 fathoms close-to, may be passed at a convenient distance: then steer for the anchorage in Pirate bay, unless intending to proceed farther in.

\*Lat. 10° 57' N.  
Long. 119° 13' E.

A sailing vessel entering the strait with a north-east wind, should pass on either side of White Round islet, and conform to the same directions as before, only keeping on the Tuluran shore, but not too close, or the vessel may get becalmed under the high land.

The passage through the second strait into the Inner sound is westward of Takbolo and Passage islands, keeping toward Durangan island to avoid Kansea rock, which does not always show.

**The COAST.**—At about 5 miles northward of Tuluran island is Custodio point, the extremity of a promontory which forms the western side of Bakit bay. At Pagnnanen point just southward of it is a quoin-shaped hill, 466 feet in height. The coast between these points and Tuluran is of a bold rocky aspect, with several land slips appearing as vertical reddish-looking stripes down the face. The southern part is indented by two bays adjoining each other; the southernmost of which, port Katába, half a mile wide at the entrance, extends  $2\frac{1}{2}$  miles in a south-east direction, and is shallow, but affords good anchorage for small vessels in 6 to 7 fathoms. Rocks front Signal head, the western entrance point of port Katába to the distance of  $1\frac{1}{2}$  cables. The northernmost bay is about a mile in length in a north-east direction, with 4 fathoms water near its head, and rocks projecting 2 cables from the south shore.

**Water.**—At two miles northward of Signal head is Calver cove, which affords a good supply of fresh water.

**Saddle and Kamago islands** front the above bays and are the northernmost of the chain of islets and rocks in the north entrance of Endeavour strait. Saddle island, the outermost, is in appearance what the name imports. A reef with one rock dry, lies E. by N.  $1\frac{1}{2}$  cables from its north end, and rocks lie off the west face. Almost joining it to the southward is Kamago, a narrow precipitous cliffy island, with several rocks awash and above water extending one-third of a mile southward towards the Needle rocks and Anato island.

Tolerable shelter from south-west winds will be found eastward of Kamago and Saddle islands, in 16 to 17 fathoms, stiff mud, care being taken to avoid the reef north-eastward of the latter.

**Tent islet**, surrounded by rocks awash, with a reef 3 cables northward of it, lies  $1\frac{1}{4}$  miles from the coast and the same distance north from Saddle island, with 15 to 23 fathoms between.

It is recommended not to pass close eastward of Tent islet, as the ground is evidently foul, and broken water has been reported.

**RUGGED LIMESTONE GROUP.**—From Custodio point, a remarkable group of rugged islands, of limestone formation, extends 8 miles in a north-north-west direction. The sides of these islands present

Chart. 2911  
[2,655].  
Var. 1° E.

bare perpendicular cliffs of every variety of tint, with numerous stalactitic caves, in which the edible birds' nest is sought. The summits terminate in small clusters of needle peaks, and wherever it is possible for vegetation to take root, they are luxuriantly clothed with foliage, of which the pandanus predominates. These, contrasting strongly with the dark-coloured rock and white sandy bays in some of the secluded nooks, impart to the group scenery of a peculiarly picturesque nature. The bases of all the islands are worn by the action of the sea water, undermining in some parts the perpendicular upwards of 15 and 20 feet, thus rendering it almost impossible, except here and there where a slip or disruption occurs, to land on any part of them.

All the islands are safe to approach, having generally upwards of 20 to 30 fathoms close to the cliffs. In their vicinity the depths vary from 20 to 30 and 40 fathoms, stiff mud.

**Guntao islands.**—North and South Guntao islands, the south-westernmost of this group are 2 cables apart, and the passage between is blocked with coral.

North Guntao is of a reddish brown aspect, one mile in length, and 300 yards wide, with a conical summit. Rocks above water, extend one cable from the north-west point, and off the south-western extreme of the island are some high rocks.

Lat. 11° 7' N.  
Long. 119° 15' E.

South Guntao, the broader and higher of the two, has a sloping summit, the south point of the island terminating in a narrow rocky cliff.

**Destacado rocks**, showing like two small boats, lie W. by S.  $\frac{3}{4}$  S.  $1\frac{1}{2}$  miles from the opening between the Guntao islands, and on this bearing Bold head, the south point of Matinlok, appears in the passage.

The depths near these rocks are 18 to 20 fathoms.

**Tapiutan**, the outer island of the Rugged group, is 7 miles from the shore. It is nearly  $2\frac{1}{2}$  miles in length north and south, the highest part, which is round topped, being 1,415 feet in height. A low neck separates this from another round hill to the northward, 670 feet high, the north-western extremity of which terminates in an isthmus head, with a precipitous fall to seaward. The shore of the island is bold all round.

**Matinlok island.**—Eastward of Tapiutan, and separated from it by a channel 2 cables wide, with 20 fathoms water, is the northern half of Matinlok, an island formed by a very narrow ridge of limestone; this island is about  $4\frac{1}{2}$  miles in length, in a north and south direction, and almost separated in three places by deep gaps.

The Horn, 1,250 feet in height, rises nearly in the centre of the island, and when viewed in a northerly or southerly direction assumes the appearance of its name, forming a conspicuous and readily recognisable feature on

making the coast. There is a sandy bay immediately under the Horn on Chart, 2,011 [2,655].  
the east side of the island. Var. 1° E.

**Inambuyod island**, lying on the north-east side of and parallel to Matinlok, is separated from it by a deep channel one mile wide; this island is similar in feature to Matinlok but smaller. Two islets, Cliff and Crown, lie respectively 1½ and 9 cables from its northern extremity, with 17 to 20 fathoms between them. There is also a remarkable rock lying one-quarter of a mile off its south-eastern face, named the Mushroom from its shape.

**Minilok island** lies eastward of the southern part of Matinlok, the channel between, in which the depth is upwards of 25 fathoms, being 1½ miles wide. It is a remarkable high rugged island, 3½ miles in circumference, with several precipitous crags, the coast nearly all around being broken up into cliffy heads, and, on the south side picturesque bays. On the north-west face are two high rocky islets.

**Pakluyaban, Entalula, and Pangutasian islands.**—On the southern side of Minilok island, nearly connected with it by a smaller island, which occupies the passage, is Pakluyaban, also of limestone formation and precipitous. Between the latter island and Custodio point are two islands; Entalula, similar in character to the above, and Pangutasian, of entirely different feature.

Pangutasian island has a double peak, and slopes gradually towards the south-east point, where there is a sandy tongue, from which a reef projects in a south-westerly direction, contracting the channel between the island and the Custodio shore, off which latter is Flat rock, to 3 cables in width, with depths of 14 to 16 fathoms.

On the eastern face, 3 cables from Pangutasian, is Popolkan, a limestone islet 310 feet in height.

**Guintungauan island, and Jip rocks.**—Guintungauan island 1½ miles west of Pangutasian, is narrow, appearing like a square block when seen in a north and south direction.

The Jip rocks are of limestone, 95 feet high, cleft in two, and lie half a mile north-eastward of Guintungauan island.

**BAKIT BAY.—Aspect.**—Bakit bay, formed partly on the west by the islands just described, is 9 miles in length, and 3 miles wide at the entrance between Minilok island and a limestone peninsula, the highest part of which, Bakit peak, is tolerably sharp, and attains an elevation of 1,500 feet. The eastern shore trends nearly north and south, and is overlooked by a high range. This range, on which there are some curiously-shaped peaks, traverses the island, commencing on the west side of Palawan at Tapiutan and Kauayan islands, embracing both shores of

Lat. 11° 8' N.  
Long. 119° 18' E.

Chart, 2,911  
[2,655].  
Var. 1<sup>8</sup>. E.

Bakit bay, and terminating on the east coast at Old Castle point and the islands fronting Tai Tai bay.

Bakit bay has general depths of 17 to 20 fathoms, mud, to abreast Lagen island, 2 miles from its head, whence it gradually shoals to about 2 fathoms close to the shore reef. It affords shelter from southerly winds and under Lagen there is probably shelter from northerly winds, but that portion has not been closely sounded.

The village of Manlalek is situated on the eastern shore.

There are several islands in the bay, all of which are precisely similar in feature and character to the group outside. Its shores are generally fringed with coral, extending from one to 4 cables. With one exception there appear to be no dangers in the bay but what are visible.

Lat. 11° 7 $\frac{1}{2}$ ' N.  
Long. 119° 23' E.

**Inabuyatan and Malpacao islands.** — Inabuyatan, the northernmost island on the eastern shore of the bay, is a conspicuous object on entering, being 1,130 feet in height and somewhat resembling the appearance of an elephant on its haunches. It lies off a bay almost blocked up by reefs.

Malpacao, a remarkable ridge of limestone, with a high boulder detached from it, assuming the form of a double island, lies nearly a mile south-eastward of Inabuyatan.

**Lagen island**, 1,140 feet in height, the southernmost and largest of the three islands on the eastern side, is of irregular form, 1 $\frac{1}{4}$  miles in length, and presents a bold cliffy shore in places, upwards of 400 feet in height, with several sandy bays.

Midway between the southern extreme of Lagen island and Long point at the head of the bay is a coral patch nearly awash, lying three-quarters of a mile from the shore; there is another midway between it and the shore north-eastward.

**Komokutuan and Dibuluan islands** lie on the western side of the bay. The former is a small precipitous island, 298 feet in height, and between it and the shore abreast, distant upwards of a mile, a spit projects 3 cables from an islet with a white rock close-to. Dibuluan island lies south-westward of Lagen; about midway between are three rocky islets, the easternmost of which shows like a ninepin on entering the bay. The other two are almost connected by reefs. In the space between Dibuluan island and Claudio point are several reefs.

In the bay close southward of the first head between Komokutuan and Dibuluan, the coral flat extends half a mile off, where also there is a rock awash at half tide, 2 cables from the mangroves.

**Manlalek** is a small village, situated a short distance up a rivulet, in the bay abreast Malpacao island on the eastern shore; it is or was stockaded.

The old and deserted village of Bakit is in the extreme south-eastern corner of Bakit bay, fronted by a mud flat dry at low water. Chart, 2,911  
[2,855].  
Var. 1° E.

**Tides.**—It is high water, full and change, in Bakit bay, at 10h.; springs rise about 6 feet. Little or no stream has been observed in the bay.

**Directions.**—The best known channel for vessels proceeding to Bakit bay, if coming from the southward, is between Entalula and Pakluyaban islands. It is 6 cables wide, and has a depth of 25 fathoms in the fairway. Lat. 11° 8' N.  
Long. 119° 18' E

The best anchorage in the south-west monsoon, for a sailing vessel, is in a depth of 17 or 18 fathoms, stiff mud, about a mile south-eastward of Komokutuan island, off the first limestone head to the westward; but as neither fresh water nor supplies are to be had readily, there is little inducement, except it be shoaler water, for vessels to go farther up; and should the wind blowing strong veer to the westward, they would probably experience some difficulty in getting out of the bay against the heavy swell which invariably accompanies it.

**KADLAO**, or Table-Top island, 2,000 feet in height, lies about 6 miles northward of Custodio point, the west extreme of Bakit bay, being separated from the coast by a channel barely 3 cables wide, in which there are 17 to 19 fathoms close to the points.

Kadlao is  $3\frac{1}{4}$  miles in length, in a north-north-west and opposite direction, with an average breadth of about half a mile. Its features are remarkable, and it forms the most conspicuous object when making the northern end of Palawan.

The tableland rises in the centre of the island, to the eastward of which, and separated from it by a deep gorge, are two peaks, of nearly equal elevation, named the East and West Loggerheads. Some of the coast cliffs overhang to a considerable extent.

There is a bay on the north side of the island close under the table-top, with an islet in it named the Mitre; and on the south-west face, 4 cables distant from the shore, is Imbalaba island, the channel between having 11 fathoms water.

Shelter in north-east winds may be found to the eastward of this island, south of the table-top, in 16 to 20 fathoms, stiff blue mud.

**Kauayan and Cavern islands.**—North of Kadlao, and separated from it by a channel about half a mile wide, in which is a peaked islet, is Kauayan island, 827 feet in height, and  $1\frac{1}{2}$  miles in length. It is of similar formation to the neighbouring islands, but has a more even summit. Lat. 11° 10' N.  
Long. 119° 21' E.

On the north-west face of Kauayan, and distant a quarter of a mile from it, is Cavern island, the extreme of the group. It is 350 feet high,

Chart 944 [2,657]. and when viewed in an east or west direction has a tall pillar rock rent from the north end. Reefs awash extend one cable from the south point of the island, and there is also a detached rock, about 30 feet in height, on the east side.

**Anchorage.**—Good shelter from south-west winds is to be had on the north side of Kadlao, off Mitre islet, in 17 fathoms, stiff mud; or if desirable, nearer to the village of Bakit, in from 9 to 12 fathoms, either abreast Abrupt head, the north-easternmost point of Kadlao, or at Santiago islet, a mile farther to the southward and close off the east face of that island.

**Tides.**—It is high water, full and change, at Cavern island, at 9h. 30m.; springs rise (one observation only)  $5\frac{1}{2}$  feet.

Lat.  $11^{\circ} 11' N.$   
Long.  $119^{\circ} 22\frac{1}{4}' E.$

**Port Talindak.**—Kadlao and the islands just described form the western side of a deep bay, the head of which is known as port Talindak. The port is about half a mile in length and breadth, but the depths are less than 3 fathoms nearly out to the western headland; within the 3-fathoms edge are several reefs nearly awash. Craft of about 7 feet draught will probably be able to reach the head of the bay where there is shelter from southerly winds off the town, distant  $1\frac{1}{2}$  cables, in about 2 fathoms.

The **village** of Talindak or Bakit, in 1851, contained a population of 200, exclusive of women and children, all Roman Catholics, under the jurisdiction of the Alcade at Tai Tai.

**Supplies.**—Goats, pigs, fowls, vegetables, &c. are procurable in small quantities; and water is obtainable from a stream at the eastern end of the beach, but not with any degree of facility.

**COAST.—Aspect.**—The coast trends in a northerly direction from port Talindak for 8 miles to Crawford point. A central range, the continuation of that over Bakit bay, overlooks both coasts of Palawan, and in the parallel of Kadlao, where it attains the greatest elevation, is a high table-top, the north-western and south-eastern shoulders of which are  $1\frac{1}{4}$  miles apart, and are respectively 2,055 and 2,230 feet in height.

There is a sharp peak 1,630 feet in height to the southward, and several hills of less elevation bordering the coast, the features of which are entirely different from those of the limestone formation, and this is nowhere so evident as at the back of Talindak village, where a sudden transition occurs.

East peak, attaining a height of 1,890 feet, lies  $4\frac{1}{2}$  miles north-eastward of the high table-top, but it is not generally observable from the west side until some distance off shore. It, however, forms a conspicuous object when to the northward and eastward of Palawan.

**Emmit**, a small wooded island, 170 feet high, with two pillar rocks at the north extremity, lies 2 cables from a point midway between Talindak and Crawford point.

The coast northward, on which is a sugar-loaf hill, is bold to approach, having a depth of 6 fathoms close to the shore; but that to the southward is fronted with coral.

**NORTH COAST of PALÁWAN.**—Abreast Crawford point the island of Paláwan is 8 miles wide, and from this, as well as Darokotan point, corresponding to it on the east coast, the island gradually contracts, forming at the northern extremity a promontory  $3\frac{1}{2}$  miles in length by  $1\frac{1}{2}$  miles in breadth. Near the termination of this is a hill 493 feet in height, with some flat land of greater elevation to the southward.

Two rocky islets lie close northward of Crawford point, from which a sandy beach extends  $1\frac{1}{2}$  miles in a northerly direction to a headland, one mile to the eastward of which is Pasco inlet, with depths of 2 to 3 fathoms.

**Lalutaya island\*** and **Gemeles islets**.—Nearly one mile northward of Crawford point are the Gemeles, two rock islets, and 3 miles northward from Crawford point, and separated from the shore by a channel  $1\frac{1}{4}$  miles wide, with depths of 9 fathoms, sand, is Lalutaya island,  $1\frac{1}{2}$  miles in length, and 407 feet in height, and—except on the eastern side, where fronting two small sand bays some coral reef extends 2 cables—is bold to approach.

**Diafila and Kalitan islands**.—On the north side of Base bay, which lies close northward of Pasco inlet is Diafila island, a mile from the shore, with a safe channel between. Kalitan island, 256 feet high, lies 2 miles northward of the latter, and half a mile westward of the northern extreme of Paláwan. There is a sharp double rock between it and the shore.

On the south side of an indentation on the coast between these islands, is North hill, 965 feet high.

**Kabuli island** lies 3 cables off the north end of Paláwan, with depths of 7 to 9 fathoms between. The island is  $1\frac{1}{2}$  miles in length, 560 feet in height, and has rather a flat summit;\* the northern extremity terminates in a small head, with 17 fathoms water almost close-to. It is bold to approach on all sides, the depths being about 20 fathoms.

**The Coast.**—The description of the islands northward will be found on page 299.

General chart, 967 [2,050].

Lat.  $11^{\circ} 15' N.$   
Long.  $119^{\circ} 24' E.$   
Var.  $1^{\circ} E.$

\*Lat.  $11^{\circ} 22' N.$   
Long.  $119^{\circ} 24' E.$

\*Lat.  $11^{\circ} 26' N.$   
Long.  $119^{\circ} 29' E.$

## CHAPTER IX.

### EAST COAST OF PALÁWAN ISLAND.

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**General remarks.**—In giving sailing directions, and a description of the east coast of Paláwan, it is to be borne in mind that, although they may be found sufficiently succinct and accurate to meet the ordinary requirements of navigators, they are, nevertheless, but the result of a few observations hurriedly collected in a run down the coast during the summer, and a beat up in the winter months of 1850, by Captain Bates, H.M. Surveying vessel *Royalist*, taken with a view to ascertain the practicability of adopting this route to China, in preference to the usual passage on the west side of Paláwan, when late in the monsoon. They are not, therefore, implicitly to be relied upon, as resulting from a well-executed survey; nor are they intended in any way to lessen the necessity of keeping that vigilant look-out which the navigation of coral seas, on all occasions, urgently demand.

The adoption of the Paláwan passage, in preference to the route on the east side of the island, is recommended as the result of Captain Bates' experience.

In the strength of the north-east monsoon, sailing vessels may, when taking the latter route, reach as far as the parallel of lat.  $10^{\circ}$  N., or to the island of Dumaran, without very great difficulty; but to get beyond this they will experience at least considerable delay, even if they succeed at all, for the current in this season sets strong to the southward, between Paláwan and the Cuyos islands, the velocity being almost in direct proportion to the strength of the wind. H.M.S. *Royalist*, in the month of December, was delayed 15 days, vainly endeavouring to get round Dumaran against the monsoon, and had, after all, to make the passage into the China sea, *via* Panay and Mindoro.

**Tides.**—The flood stream sets along the shore to the southward, and the ebb to the northward. The maximum velocity observed was  $1\frac{1}{2}$  knots, and the rise 7 feet. The currents on the east coast depend chiefly on the prevailing winds. See preceding remarks.

\*Lat.  $8^{\circ} 20' N.$   
Long.  $117^{\circ} 10' E.$   
Var.  $14^{\circ}$  E.

**The EAST COAST** to the northward of cape Buliluyan,\* the south extreme of Paláwan, has been only partially surveyed; and that part between Rawnsley and Madripore points, a distance of 5 miles, named Coral bay on the chart, is merely sketched in, and no soundings have been taken near it. It is low, consisting chiefly of mangrove.

At  $2\frac{3}{4}$  miles beyond Madri pore point is Deception point, and at 5 miles Var.  $1\frac{1}{2}^{\circ}$  E. farther to the eastward is Church point, having a reef extending from it which dries off  $1\frac{1}{2}$  miles to the south-east. Wooded hills lie within the point. Between Church and Deception points are two bights with depths of 4 and 6 fathoms water.

**Caution.**—The space within a line joining Church point to the south extreme of Bugsuk island is encumbered with shoals, and in a south-east direction from Reef island they extend nearly 2 miles outside that line. Reef island stands about  $3\frac{1}{2}$  miles within the eastern edge of these dangers, some of which dry at low water.

Other shoals than those mentioned here and below, probably exist in the neighbourhood of Ursula island.

**OFFLYING ISLAND AND DANGERS.—Ursula** Lat.  $8^{\circ} 20' N.$   
Long.  $117^{\circ} 30' E.$   
**island** is situated about 10 miles southward of Church point. It is one-third of a mile in length, low, covered with wood, and surrounded by sand. The south side is steep-to, but a reef, dry at low water, extends nearly a mile in a north-east direction from the north part of the island.

At  $2\frac{1}{2}$  miles N.W. by W. from the summit of Ursula island, is a  $2\frac{1}{2}$ -fathoms coral patch; and there is also another coral patch with apparently very little water, N.  $\frac{3}{4}$  E. 5 miles from the island, the depths between varying from 14 to 40 fathoms.

To the southward and south-eastward of Ursula, for the distance of 5 miles or more, the bottom is very irregular; a shoal, having  $3\frac{1}{2}$  fathoms and probably less water, is situated about 3 miles S.  $\frac{1}{2}$  E. from Ursula island, and  $2\frac{3}{4}$  miles E.  $\frac{1}{2}$  S. of the island there is another shoal with  $2\frac{1}{2}$  fathoms; other patches of 6, 8, and 9 fathoms, coral, with deep water around them, also exist.

**Tides.**—It is high water, full and change, at Ursula island at 11 h.; springs rise  $7\frac{1}{2}$  feet.

**Argyll shoal**, on which the British barque *Argyll* was totally lost in 1892, was found by the Spanish gun-vessel *Mariveles* to lie with Ursula island bearing N.  $72^{\circ}$  W., distant about 5 miles. Lat.  $8^{\circ} 10' N.$   
Long.  $117^{\circ} 35' E.$

**Wright shoal**, lies with Ursula island, bearing W.  $\frac{1}{2}$  N., distant 9 miles; it is  $1\frac{1}{2}$  miles in length east and west, half a mile in breadth, with  $1\frac{1}{2}$  fathoms on its shoalest part, and depths of 47 to 70 fathoms close around.

**Ginn shoal.**—Mr. Ginn, Master of the American barque *Coryphene*, 1886, reported the existence of a shoal lying about S.S.E.  $\frac{1}{2}$  E. from Wright shoal, distant about  $7\frac{1}{2}$  miles.

This shoal was first seen from aloft, bearing S. by E., at the distance of about 4 miles (Ursula island being just visible from the deck); soon

Var.  $1\frac{1}{2}$ ° E.

afterwards Wright shoal was seen from aloft, bearing N.N.W., distant about  $3\frac{1}{2}$  miles. Wright shoal appeared a light green colour without breakers; Ginn shoal was white in colour with the sea breaking near its centre (wind and sea moderate), and was therefore considered to have less water on it than on Wright shoal; the two shoals appeared to be of about the same extent.

Lat.  $8^{\circ} 6' N.$   
Long.  $118^{\circ} 6\frac{1}{4}' E.$ 

**Moyune shoal.**—The master of the s.s. *Moyune*, 1897, reported that his vessel struck on a rock with 26 feet water, approximately in the position noted in the margin. Not seen, November 1901, by U.S.S. *General Alava*, which vessel passed  $1\frac{1}{4}$  miles from this position.

Lat.  $8^{\circ} 21' N.$   
Long.  $117^{\circ} 55\frac{1}{4}' E.$ 

**Wakefield shoal**, on which the British ship *Wakefield* struck in 1889, has a least known depth of  $3\frac{1}{2}$  fathoms, over coral and sand; it is almost  $1\frac{1}{2}$  miles in length in an east-north-east and opposite direction, by 2 cables in breadth, and lies in about the position noted in the margin.

The shoalest spot is on its south-west side and close off there was no bottom at 90 fathoms.

**Circe shoal.**—The Spanish Government schooner *Circe*, 1862, obtained a sounding of  $4\frac{1}{2}$  fathoms on a bank of coral, which is placed on the charts about 5 miles northward of Wakefield shoal.

It is not improbable that Wakefield and Circe shoals are identical.

Lat.  $8^{\circ} 33' N.$   
Long.  $117^{\circ} 32\frac{1}{4}' E.$ 

**COAST.—Pirate island**, less than 2 cables in extent, lies  $5\frac{1}{2}$  miles north-eastward of Church point, and  $1\frac{1}{4}$  miles from the Palawan shore near mount Sarap. A reef extends three-quarters of a mile from it in an E.S.E. direction; and there is a patch of coral with 3 fathoms, lying S.S.W.  $\frac{1}{4}$  W. nearly a mile from the island.

**ST. ANTONIO or ROCKY BAY** is backed by the Panalingahan hills noticed on page 225, and has its southern limit about 6 miles north-north-eastward of Church point. Three small rivers discharge on the western shore of the bay, the northernmost of which had some houses near the entrance; there is another stream close to the north-east point of the bay.

The depths, at from 5 to 7 miles from the coast on either side of Rocky bay, are very irregular, varying from 7 to 30 fathoms, having apparently long ridges of coral, with 4 to 7 and 10 fathoms over them, extending almost across the bay.

**Outer Four-fathoms patch.**—The outermost of the above patches that have been discovered has 4 fathoms on it, and lies with Pirate island bearing W. by N. distant 6 miles.

Lat.  $8^{\circ} 33' N.$   
Long.  $117^{\circ} 38' E.$ 

**A five-feet patch**, on a coral shoal with an average depth of  $3\frac{1}{2}$  fathoms, lies  $2\frac{1}{2}$  miles within Outer Four-fathoms patch in the direction of Gull sand-banks, and E.  $\frac{3}{4}$  N., distant  $3\frac{1}{2}$  miles from Pirate island.

**Gull and Egg sand-banks**, nearly 2 miles apart, with dry patches on them, lie in the entrance of Rocky bay; the former

N.E. by E.  $\frac{1}{2}$  E., 2½ miles, and the latter N.E.  $\frac{2}{3}$  E., nearly 4½ miles from Var. 11° E. Pirate island. There is a small 2-fathoms patch, about 1½ miles N.N.W. of Egg sand-bank. Within these sand-banks the depths decrease gradually from 22 to 4½ fathoms, stiff mud, towards the head of the bay.

Off the reef that lines the western shore of the bay there are some rocks and dry sand patches, the largest of which, a mile in extent, lies 2 miles north of Pirate island, and one mile from the shore.

**Huevo bank**, about 3 miles in extent, with a depth of 4½ to 7 fathoms, lies with Segyam point, bearing W.N.W., distant about 5 miles from the shoalest parts.

**Segyam islands** are two low islands connected with the shore at Lat. 8° 40' N.  
Long. 117° 38' E. the north-east point of the bay, and have reefs near them, the largest patch lying S.S.W. 6 cables from the westernmost island, with from 8 to 10 fathoms close to. There is anchorage in a depth of 6 fathoms, soft mud, affording shelter during the north-east monsoon, under the lee of the western Segyam island.

Foul ground extends off St. John point, and a coral reef with a depth of 7 feet over it lies about one mile south-south-westward therefrom; numerous shoal spots are reported to exist to the north-eastward of Huevo bank, 4 miles from the shore in the approach to Marangas.

**Caution.**—Vessels having no object in coming into St. Antonio bay should not close this part of the coast nearer than 6 miles.

The COAST from the Segyam islands trends east-north-eastward 13 miles to Sir James Brooke point, from which a dangerous reef extends about one mile in a south-south-westerly direction. Thence in the same direction and for nearly a like distance to Nose point, which is low and wooded with a small hill at the back of it; the intermediate land is a low, densely-wooded plain, well populated, with several cultivated spots, and overlooked by the high range of Mantalingahan.

The coast is slightly indented, and bold generally, as far as is known, to about half a mile, the depths when that distance from it being about 6 fathoms. Several streams of fresh water flow into the bays, and some of the points have projecting reefs, that off Nose point extending nearly half a mile. Three miles west-south-westward of Nose point is a reef awash at half a mile from the shore.

**Takbolubo**, about 7 miles north-eastward of the Segyam islands, is Lat. 8° 43' N.  
Long. 117° 44' E. a Malay settlement, and well populated. Goats, sweet potatoes, and fruit in small quantities may be obtained; and also water from a rivulet in fine weather, when there is no surf on the beach. There is anchorage in the roadstead off the settlement in a depth of 12 to 16 fathoms, stiff mud, about a mile, or upwards, from the shore, with Matalingahan mountain bearing N.W. by N., and Addison peak, a remarkable thumb shoulder at

Var. 14° E.

the end of a spur, N. by E. Reefs project 3 cables off both the points forming the bay.

There is a settlement at Prahu point, about 8 miles to the north-east, and another apparently at Korum just westward of Nose point.

The depths generally from 3 to 4 miles off the coast between Segyam islands and Nose point, vary from 20 to 30 fathoms, mud, deepening as the latter point is approached, with patches of 6 and 8 fathoms, coral, occasionally. Foul ground with less depth is reported to exist south and south-east of Sir James Brooke point, from which point a dangerous reef extends about one mile in a south-south-west direction; see page 275, and following paragraph.

**Foul ground.**—An area of foul ground, with depths of less than 4 fathoms over it in some places, is reported to lie about 7 miles south-eastward of Sir James Brooke point, between approximately lat. 8° 35' N. and 8° 43' N., long. 117° 50' E. and 117° 59' E.

Nearly all the shoals in this locality appear to have less water on them than is shown on the chart.

**Shoals.**—The following shoals are reported to exist southward and south-eastward of Nose point:—

Depth 9 fathoms, lat. 8° 46' N., long. 118° 0' E.	◦
" 7½ "     " 8° 45' N.,     " 118° 2' E.	◦
" 10 "     " 8° 46' N.,     " 118° 7' E.	◦
" 6 "     " 8° 43' N.,     " 118° 10' E.	◦

The last of these shoals was reported in 1905 to have less water over it; there is another reef situated about  $1\frac{1}{4}$  miles S. 67° W. from it. There are other shoals with depths of 5 fathoms over them in approximately lat. 8° 39' N., long. 118° 6' E., but between this position and Palawan island the ground appears to be foul and dangerous.

Lat. 8° 53' N.  
Long. 118° 14' E.

**East island (Komei Komeian or Tagalinog),** is a low coral island nearly half a mile in extent, covered with trees, the tops of which are visible about 20 miles off; it has a reef extending from the eastern side, on the extremity of which are some bushes half a mile from the island. There is no anchorage near it, the depths around being upwards of 100 fathoms.

**Marabout shoal,** on which the British ship *Marabout*, of 24 feet draught, grounded in 1885, is composed of coral, and considered to have a depth of about 3 fathoms; from it East island bears S.W. by W.  $\frac{3}{4}$  W., distant about 8 miles.

Lat. 9° 0' N.  
Long. 118° 19' E.

**Altnacraig shoal,** on which the British barque *Altnacraig* became a total wreck in 1889, lies in the position here given, or possibly some 2 or 3 miles further east.

The U.S.S. *Quiros* passed over it on 3rd January 1903, running for a distance of  $1\frac{1}{2}$  miles in shoal water, the least sounding obtained being

6 fathoms. The ship passed close to a shoal head with apparently a Var.  $1\frac{1}{2}$  E. depth of about one fathom over it, from near which position the centre of East island bore S.  $32^{\circ}$  W., and the highest peak of Pulute range N.  $72^{\circ}$  W. The shoal appeared to be of considerable extent.

**Caution.**—It must be borne in mind that this sea is but imperfectly sounded and that many other dangers may exist in this locality, which is so studded with isolated rocks and shoals, that extreme caution is necessary when navigating here.

**The COAST** from Nose point\* trends north-eastward about 11 miles \*Lat.  $8^{\circ} 52' N.$  Long.  $117^{\circ} 50' E.$  to Crawford cove, which is a mile in length with 5 fathoms water at the entrance. Davie hill lies nearly two miles to the southward, and on the north side of the cove is the southern extremity of a coast range.

Close northward of Crawford cove are several low coral islands fronting the shore, giving rise to the name of Island bay.

Several coral patches at the depth of 6 to 12 fathoms, lie off the coast southward of Crawford cove, distant 3 to 7 miles from the shore.

A shoal, with a depth of less than 3 fathoms over it, is situated about Lat.  $8^{\circ} 58' N.$  Long.  $118^{\circ} 5' E.$  2 miles to the eastward of Eustasia point.

**ISLAND BAY** has been only partially sounded; but sufficiently so, however, to ascertain that several shoal patches exist, and that, close in, it is hazardous for vessels to navigate.

The plain intervening which extends across the island to Tebeyu bay, distant about 9 miles, is cultivated in many parts, and broken up into several detached hills of conical form, at the back of which the Saddle hill of Pulute, and Steep cliff on the Malanut range, are conspicuous.

From Relief point, in the north-east part of the bay, coral ground, on which there are patches of 3 feet to 12 feet, extends  $1\frac{1}{4}$  miles south-west.

**Water.**—There is a fresh-water rivulet at half a mile north-west of Relief point.

**Gardiner, Bessie, and Reef**, three low islands, upwards of a mile from each other, lie in a north-east direction from Crawford cove more than a third of the distance across Island bay. Reef island, the north-easternmost, has its eastern side surrounded by coral, which dries half a mile from it, with 14 fathoms near the edge.

Another group of islands and sandbanks lie in-shore and to the northward of these, fronting the head of the bay; the depth of water between and around them is 6 to 7 fathoms.

A patch of  $2\frac{1}{2}$  fathoms lies nearly midway between Reef island and Lat.  $9^{\circ} 7' N.$  Long.  $118^{\circ} 11' E.$  Relief point, and 3 miles off shore, with the north extreme of Reef island, bearing S.W. by W.  $\frac{1}{4}$  W., and the Button, a bush islet near the shore, N.  $\frac{3}{4}$  W.

**The COAST** from Relief point trends 6 miles eastward to Bivouac point, where a stream of fresh water breaks through the shingle. There

Var.  $13^{\circ}$  E.

is a rock awash nearly midway between the two points, at half a mile from the shore.

In front of this part of the coast, at  $3\frac{1}{2}$  miles from the shore, is a 3-fathoms coral patch, with depths of 15 to 16 fathoms, mud, within it, which lies with Bivouac point N.E.  $\frac{1}{2}$  N.  $4\frac{1}{2}$  miles. Another patch, of 5 fathoms, surrounded by deep water, lies with Bivouac point bearing N.N.W.  $\frac{3}{4}$  W., distant  $4\frac{1}{2}$  miles.

The bottom is uneven between Island bay and East island, with rocky patches here and there of 6, 7, and 12 fathoms.

**Flat island**, lying 6 miles eastward of Bivouac point, and fronting Mantakwin bay, is 2 miles in extent, north and south, low, and covered with trees. It is separated from a sandy tongue projecting from Casuarina point on the mainland, by a channel 4 cables wide, in which there is a depth of 8 fathoms. On its north-east face a coral spit extends half a mile.

Lat.  $9^{\circ} 14' N.$   
Long.  $118^{\circ} 24' E.$ 

In the bay on the western side of the island, there is good shelter from north-east winds in a depth of 5 to 6 fathoms, mud, with the south-west extremity of the island, bearing S.E., and Emmeline island, the southernmost of some small islands just detached from the opposite shore, S.W. by W.

Emmeline island is bold to approach, but the reef, which fronts the south and western shores of Flat island, extends 4 cables, with a depth of 8 to 9 fathoms close to the edge.

A reef covered with one fathom water lies in the middle of the south entrance, and another in the middle of the anchorage.

A reef projects 6 cables southward of Casuarina point in the north entrance, with 8 fathoms close-to.

**Caution** is necessary in going into this bay, as it has been only partially sounded. No watering-place was found in it.

**Tides.**—It is high water in this vicinity, full and change, at midnight and on the day following at 9 h. 30 m. a.m. Rise of tide  $6\frac{3}{4}$  feet. See general remarks on page 272.

**Shoals.**—A shoal half a mile in extent, with a depth of 4 fathoms over it and 10 fathoms around, is reported to exist at a distance of  $3\frac{1}{2}$  miles S.  $7^{\circ}$  W. from the south-east point of Flat island. It is possible that this shoal may be connected to the 7-fathoms patch  $1\frac{1}{2}$  miles to the northward of it.

Lat.  $9^{\circ} 6' N.$   
Long.  $118^{\circ} 34' E.$ 

A shoal, the existence of which was reported in 1900, is charted S.E.  $\frac{1}{2}$  E. 10 miles from Flat island.

**Sand island** lies  $3\frac{1}{4}$  miles eastward of the north extreme of Flat island. It is one quarter of a mile in extent, covered with wood, and surrounded by a reef dry at low water, which, on the eastern side, extends half a mile from the island, with depths of from 6 to 12 fathoms close to the edge.

The depths outside Flat and Sand islands vary from 20 to 40 fathoms, mud; in their immediate vicinity the depths are 10 and 12 fathoms, mud, decreasing gradually to the shore. Shoaler casts, such as 6 and 7 fathoms of sand and coral, here and there, may always be anticipated.

At  $1\frac{1}{2}$  miles S.W.  $\frac{2}{3}$  W., from the centre of Sand island, is a  $5\frac{1}{2}$ -fathoms patch of coral.

**30th of June island**, lying N.E. by N.  $8\frac{3}{4}$  miles from Sand island, and  $2\frac{1}{2}$  miles off shore, is similar in all respects to Sand island, the reef on the east side extending only 4 cables.

**Maltby island**, nearly as large, and of the same description as Flat island, lies 4 miles N.N.E. of the 30th of June island, being separated from the Palawan shore by a channel one mile wide, but which has not been sounded. A rocky spit extends 4 cables from the south-west point of Maltby island.

Two dry sand-banks on reefs lie between 30th of June and Maltby islands, the depth of water in the vicinity being from 4 to 7 fathoms, and there is a reef awash N.W. three-quarters of a mile from the former islands.

**Shoals.**—East, 6 miles from 30th of June island, there is a bank of sand and coral upwards of 5 miles in extent, on which the least water discovered is  $6\frac{1}{2}$  fathoms; close outside there is no bottom at 80 fathoms; the depths between the bank vary from 12 to 20 fathoms.

**Rocky ground** extends about 5 miles in a northerly direction from this bank, where, at the extremity, there is as little as  $3\frac{1}{2}$  fathoms, perhaps less.

This patch lies east of Village bay about  $2\frac{1}{2}$  miles from the shore, and from it the north extreme of Maltby island bears S.W. by W., distant 3 miles, and the huts in Village bay, W.  $\frac{2}{3}$  N.

**The COAST** abreast these islands partakes of the same features as that farther to the southward, being low and thickly wooded. Victoria peak, 5,680 feet in height, overlooks it, and the mountain range, which presents some deep gorges and picturesque valleys, is fronted by an extensive and densely wooded plain; the hills do not approach the sea until near Table head, which is low, and situated 12 miles north-eastward of Maltby island. On the north side of Table head is a small inlet for boats.

**Village bay**, in which are a few huts, 2 miles northward of Maltby island, is small, and a coral patch, 6 cables in extent, occupies its centre.

Chart. 2,914  
[2,652].  
Var. 1° E.

Off the south point of the bay are two islets connected with the shore by a reef, and a reef fronts the north point to the distance of a mile.

**Water.**—There is a good fresh water stream 5 miles south-westward of Table head.

Lat. 9° 44' N.  
Long. 118° 48' E.

**PORT PRINCESA** (native name Iuahit), formerly known as port Royalist, is situated  $4\frac{1}{2}$  miles north-eastward of Table head; Saboruco or Tidepole point, the inner extreme point of low land on the north side at the southern end of the town, is in the position noted.

The port is surrounded by a densely wooded plain, fronting a high mountain ridge to the south-west of mount Peel, of which mount Beaufort and Thumb peak are conspicuous. The latter when seen from the south-east, appears as a steep conical mountain with a knob on the summit, and when in line with the entrance of the harbour, bears N.W. by W.  $\frac{1}{2}$  W.

**The Entrance** is a strait nearly 3 miles in length in a W.N.W. direction, and 2 miles in width, from the latter part of which the port extends 3 miles in a northerly direction and is 2 miles wide. In the entrance the depth is 25 fathoms, mud, which decreases as the head of the port is approached to 4 and 5 fathoms close to the reef. The north and western shores are chiefly mangrove, the former having several bays and inlets, all of which are shoal and fronted with coral.

**Coral spits** project from both the outer points of the entrance which contract the channel to one mile in width. The south spit extends 7 cables from the shore, while the north projects 5 cables; parts of both dry at low water.

The reefs forming these spits extend along the coast outside and have 12 to 13 fathoms close to the edge; that on the north has several dry patches. Spits extend off portions of the coast within, for which see the plan.

**Inlets.**—There are two inlets within the entrance on the south side. The eastern has a rock at its entrance, lying off a red cliff, which when first seen may be easily mistaken for some native huts. The western and largest is upwards of  $1\frac{1}{2}$  miles in length, and has a coral spit, projecting nearly 4 cables from Heron point, its north entrance point.

There are depths of 5 to 10 fathoms in both these inlets, but their entrances are much contracted by the coral reefs on either side.

**Iuahit or Ewiig river** lies on the western side of the port and has a small island in the entrance.

This river is navigable for boats about 3 miles up; half a mile farther is a village, which carries on a small traffic in beeswax, rice, maize, &c., with some of the contiguous settlements. After heavy rains the river is fresh almost at the entrance.

Mud dries at low water nearly three-quarters of a mile from the entrance, Chart, 2,914 [2,852], through which are two boat channels diverging from either side of the Var. 1<sup>4</sup> E. island at the mouth of the river.

**Cana or Harbor island** lies off the largest opening on the north shore of the port; and besides being connected with the shore by reefs, has a rocky spit, and some detached coral patches extending 8½ cables from it in a southerly direction, the outer one being a rock awash at low water springs, with a depth of 6 fathoms close-to.

**Mole.**—Obando mole projecting from the north-west part of Buckle point, is 136 yards in length, with a depth of 13 feet water at its extremity.

Between the mole and Saboruco point, fronting the town, shoal water within a depth of 3 fathoms extends to the distance of 2½ cables from the shore.

**Gedeon shoal.**—In the middle of the harbour westward of Obando mole, is Gedeon shoal, of coral, about 2½ cables in length and one cable wide, upon which the least depth is 4 feet; a black can buoy is moored on its south-eastern edge.

A small detached coral patch with less than 9 feet water over it lies one cable southward of the shoal.

**A ridge,** about 3½ cables in length north-east and south-west, with depths over it of from 5½ to 7 fathoms, lies 4½ cables south-west of Saboruco point on the southern side of the fairway.

**Anchorage.**—During the north-east monsoon, the best place to anchor is above Gedeon shoal, eastward of the rock awash before mentioned and about N. by W. ½ W. from Obando mole, in about 11 fathoms, mud. The shore reef and Gedeon shoal are both steep-to, with depths of 12 to 14 fathoms, and the passage between them is 2½ cables in width. In the other season, vessels may lie farther to the southward.

**Tides.**—It is high water, full and change, approximately, at port Princesa, at 11 h. 0 m.; springs rise 6½ feet.

**LIGHTS.**—From a white tower on Saboruco point, is exhibited at an elevation of 43 feet above high water, a *fixed white* light visible in clear weather from a distance of 5 miles, but the light cannot be seen outside the heads. The dwelling of the light-keeper is joined to the northern side of the tower.

A *fixed red* light is exhibited from a tower, 13 feet high, on the extremity of Obando mole.

**Directions.**—It is not until a vessel approaches within a mile of the entrance that soundings will be obtained, when from 120 fathoms the depths suddenly decrease to 20 or 30 fathoms, sand. This change is sometimes marked by a ripple on the surface. The coast on either side of the approach should be given a berth of at least a mile.

Chart 2,914  
[2,652].  
Var. 1 $\frac{1}{4}$  E.

Vessels should keep in mid-channel between the entrance points; Saboruco point in line with Thumb peak, leads clear of the North spit, and the same point in line with mount Beaufort, clears the South spit.

Having passed the spits, keep the northern side of the strait; and when Saboruco point is abeam, distant about 2 cables, head for mount Beaufort, steering N.W.  $\frac{1}{4}$  W., until Obando mole head bears N. by E.  $\frac{3}{4}$  E., when a North course will lead midway between the mole head and Gedeon shoal. Anchor as convenient 3 or 4 cables above the mole in a depth of from 11 to 14 fathoms, mud.

Anchorage may also be taken southward of Gedeon shoal in 12 to 16 fathoms, mud, where there is ample space; the most convenient appears to be from about 4 cables south-west of Bateria point to 3 cables north-west of the same point.

It is recommended not to go beyond half a mile to the northward of Buckle point, as the channel between the reefs becomes narrow.

During easterly winds a heavy swell sets into the entrance, which breaks violently on the reefs, and also across the bay to the southward of the river.

Lat. 9° 43' N.  
Long. 118° 3' E.

**Coral bank.**—A small coral bank, with apparently a depth of from 10 to 15 fathoms over it, lying about 17 miles eastward of port Princesa, was passed over by the U.S.S. *General Alava* in November 1901. No soundings were obtained on this bank, which may possibly be a danger, and should therefore be given a berth.

**DEEP (HONDA) BAY**, lies northward of port Princesa, abreast Ulugan bay on the opposite side of the island, the plain intervening, on either side of which mount Peel and the Cone are conspicuous, the island being here only 5 miles wide. In approaching Deep bay from the eastward mounts Herschel and Airy appear as two islands between mount Peel and the range to the southward.

Four low coral islands, covered with trees, lie in the bay in a line parallel with the shore; between these and the shore is another group of four islands, reefs and dry sand patches, all of which have been but imperfectly examined.

Lat. 9° 59' N.  
Long. 118° 56' E.

Castle point, on the north shore of Deep bay, probably so named from a rocky protuberance on the brow of the hill over it, is the commencement of a bold range which borders the coast to Green Island bay. At 2 $\frac{1}{2}$  miles westward of Castle point is a small river, navigable for boats, and there is also a stream of fresh water three-quarters of a mile eastward of the point.

At 14 miles eastward of Castle point, is Bold point, with a double hill over it, forming the north-east extremity of Deep bay, and is, as regards both the aspect of the land and depth of water near it, quite what the name imports.

**Ramesamei and Makesi islands.**—Ramesamei,\* the south-westernmost of the four low coral islands, mentioned above, lies in a bend on the western side of Deep bay, a mile from the shore, and  $8\frac{1}{2}$  miles to the northward of port Princesa or Royalist. It is surrounded by a reef to the distance of a quarter of a mile; Tuft islet lies three-quarters of a mile south-east from it.

\*Lat.  $9^{\circ} 51' N.$   
Long.  $118^{\circ} 45' E.$   
Var.  $1\frac{1}{2}^{\circ}$  E.

Makesi island, situated E.N.E.,  $3\frac{3}{4}$  miles from Ramesamei island, is of similar form, three-quarters of a mile in circumference, and has shoal water extending  $1\frac{1}{2}$  to 2 miles from its southern point.

**Meara and Fraser islands** lie inshore of the above; the latter has shallow water extending some distance off its eastern side.

A reef, partly dry at low water, lies half a mile south-east of the north point of the mangrove inlet abreast, and a bush islet lies close to the shore at one mile northward of it.

There are depths of 3 and 4 fathoms within Ramesamei and Meara islands, and of 10 fathoms near the entrance of the inlet.

**Tapul bay**, within these islands, was used by the Spaniards as a military station.

The channel leading to it is between Fraser and Makesi islands:—To enter, pass the shoal off the north-west point of Makesi at about one cable, and steer N. by W.  $\frac{1}{2}$  W. for a hill with trees on it, situated in a remarkable ravine. The depth will be 9 fathoms until near Bush island, when anchor in the middle of the bay in  $6\frac{1}{2}$  fathoms, with the east point bearing E.S.E.

**Reef island**, lying 4 miles east-north-east of Makesi island, is, including the reef that surrounds it, upwards of a mile in extent, and there is a sandbank, dry at low water, at 3 cables from its south-west extreme.

**A rocky bank**, nearly dry at low water,  $1\frac{3}{4}$  miles in length in a north-west and south-east direction, lies half-way between Reef and Makesi islands; northward of the bank, and between Reef island and the shore, a distance of  $3\frac{1}{2}$  miles, are two of the four islands, composing the inner group, with a dry sand patch off the outer extremity of each. The depth of water between the rocky bank and Reef island is 11 to 12 fathoms.

\*Lat.  $9^{\circ} 53' N.$   
Long.  $118^{\circ} 51' E.$

**Anchorage island**, about, 2 miles in circumference, the north-easternmost and largest of the group, has a reef fronting the eastern side, which at low water dries off 3 cables, and a rock awash at nearly three-quarters of a mile from the north-west point. The channel inside this island is encumbered by two reefs, with dry sand-patches on each, and a shallow spit which extends half a mile from near Castle point.

Between Castle point and Anchorage island the depths vary from 12 to 17 fathoms.

Chart 2914  
[2,652].  
Var. 14° E.

Vessels should keep in mid-channel between the entrance points; Saboruco point in line with Thumb peak, leads clear of the North spit, and the same point in line with mount Beaufort, clears the South spit.

Having passed the spits, keep the northern side of the strait; and when Saboruco point is abeam, distant about 2 cables, head for mount Beaufort, steering N.W.  $\frac{1}{4}$  W., until Obando mole head bears N. by E.  $\frac{3}{4}$  E., when a North course will lead midway between the mole head and Gedeon shoal. Anchor as convenient 3 or 4 cables above the mole in a depth of from 11 to 14 fathoms, mud.

Anchorage may also be taken southward of Gedeon shoal in 12 to 16 fathoms, mud, where there is ample space; the most convenient appears to be from about 4 cables south-west of Bateria point to 3 cables north-west of the same point.

It is recommended not to go beyond half a mile to the northward of Buckle point, as the channel between the reefs becomes narrow.

During easterly winds a heavy swell sets into the entrance, which breaks violently on the reefs, and also across the bay to the southward of the river.

Lat. 9° 48' N.  
Long. 118° 3' E.

**Coral bank.**—A small coral bank, with apparently a depth of from 10 to 15 fathoms over it, lying about 17 miles eastward of port Princesa, was passed over by the U.S.S. *General Alava* in November 1901. No soundings were obtained on this bank, which may possibly be a danger, and should therefore be given a berth.

**DEEP (HONDA) BAY**, lies northward of port Princesa, abreast Ulugan bay on the opposite side of the island, the plain intervening, on either side of which mount Peel and the Cone are conspicuous, the island being here only 5 miles wide. In approaching Deep bay from the eastward mounts Herschel and Airy appear as two islands between mount Peel and the range to the southward.

Four low coral islands, covered with trees, lie in the bay in a line parallel with the shore; between these and the shore is another group of four islands, reefs and dry sand patches, all of which have been but imperfectly examined.

Lat. 9° 59' N.  
Long. 118° 56' E.

Castle point, on the north shore of Deep bay, probably so named from a rocky protuberance on the brow of the hill over it, is the commencement of a bold range which borders the coast to Green Island bay. At 2½ miles westward of Castle point is a small river, navigable for boats, and there is also a stream of fresh water three-quarters of a mile eastward of the point.

At 14 miles eastward of Castle point, is Bold point, with a double hill over it, forming the north-east extremity of Deep bay, and is, as regards both the aspect of the land and depth of water near it, quite what the name imports.

**Ramesamei and Makesi islands.**—Ramesamei,\* the south-westernmost of the four low coral islands, mentioned above, lies in a bend on the western side of Deep bay, a mile from the shore, and  $8\frac{1}{2}$  miles to the northward of port Princesa or Royalist. It is surrounded by a reef to the distance of a quarter of a mile; Tuft islet lies three-quarters of a mile south-east from it.

Makesi island, situated E.N.E.,  $3\frac{3}{4}$  miles from Ramesamei island, is of similar form, three-quarters of a mile in circumference, and has shoal water extending  $1\frac{1}{2}$  to 2 miles from its southern point.

**Meara and Fraser islands** lie inshore of the above; the latter has shallow water extending some distance off its eastern side.

A reef, partly dry at low water, lies half a mile south-east of the north point of the mangrove inlet abreast, and a bush islet lies close to the shore at one mile northward of it.

There are depths of 3 and 4 fathoms within Ramesamei and Meara islands, and of 10 fathoms near the entrance of the inlet.

**Tapul bay**, within these islands, was used by the Spaniards as a military station.

The channel leading to it is between Fraser and Makesi islands:—To enter, pass the shoal off the north-west point of Makesi at about one cable, and steer N. by W.  $\frac{1}{2}$  W. for a hill with trees on it, situated in a remarkable ravine. The depth will be 9 fathoms until near Bush island, when anchor in the middle of the bay in  $6\frac{1}{2}$  fathoms, with the east point bearing E.S.E.

**Reef island**, lying 4 miles east-north-east of Makesi island, is, including the reef that surrounds it, upwards of a mile in extent, and there is a sandbank, dry at low water, at 3 cables from its south-west extreme.

**A rocky bank**, nearly dry at low water,  $1\frac{1}{2}$  miles in length in a north-west and south-east direction, lies half-way between Reef and Makesi islands; northward of the bank, and between Reef island and the shore, a distance of  $3\frac{1}{2}$  miles, are two of the four islands, composing the inner group, with a dry sand patch off the outer extremity of each. The depth of water between the rocky bank and Reef island is 11 to 12 fathoms.

**Anchorage island**, about, 2 miles in circumference, the northeasternmost and largest of the group, has a reef fronting the eastern side, which at low water dries off 3 cables, and a rock awash at nearly three-quarters of a mile from the north-west point. The channel inside this island is encumbered by two reefs, with dry sand-patches on each, and a shallow spit which extends half a mile from near Castle point.

Between Castle point and Anchorage island the depths vary from 12 to 17 fathoms.

\*Lat.  $9^{\circ} 51' N.$   
Long.  $118^{\circ} 45' E.$   
Var.  $1\frac{1}{2}^{\circ}$  E.

Var.  $1\frac{1}{2}$ ° E.

**Off-lying banks.**—There is a bank off Deep bay, with 5 fathoms on it, upwards of 2 miles in extent, lying nearly in a direct line between port Princesa or Royalist, and Bold point, and S.S.E.  $6\frac{1}{2}$  miles from Anchorage island.

A bank with 17 fathoms lies  $5\frac{1}{2}$  miles south-east of Bold point, but beyond this, and also within 2 miles of the coast to the westward of the point, there is no bottom at 170 fathoms; nor are soundings obtained at this depth (unless within 3 cables of the shore, where the depth is 30 fathoms) all along the coast, until 3 miles south-east of Anchorage island, when it changes suddenly to 6, 9 and then 20 fathoms.

Lat.  $9^{\circ} 54'$  N.  
Long.  $119^{\circ} 23\frac{1}{4}'$  E.

**Pasig shoal**, with a depth of 2 fathoms, extends about one mile in a north-north-west and opposite direction, with a breadth of about 5 cables. It appears to be the south-easternmost of a chain of shoal patches, connected by shallow water with Charybdis bank and Constancia shoal. Depths of 6 and 7 fathoms were obtained on the south-east side of the shoal, but a short distance to the north-west there are patches of 2 to 3 fathoms, or less in places.

There is another patch, with probably about the same depth on it, lying  $1\frac{1}{2}$  miles N.N.W.  $\frac{1}{2}$  W. from Pasig shoal, and there was apparently a third patch about the same distance N.W. of the second.

With the sun in a suitable position, these patches show distinctly; others, however, may exist in this neighbourhood.

**Charybdis bank**, with 4 fathoms water, is charted nearly 4 miles N. by E.  $\frac{3}{4}$  E. from Pasig shoal.

Lat.  $9^{\circ} 59'$  N.  
Long.  $119^{\circ} 25'$  E.

**Constancia shoal**, with  $3\frac{1}{2}$  fathoms is charted N.W.  $\frac{1}{2}$  N.  $5\frac{1}{2}$  miles from Pasig shoal.

\*Lat.  $10^{\circ} 7'$  N.  
Long.  $119^{\circ} 8\frac{1}{4}'$  E.

**COAST.—Green islands.**—From Bold point the hills forming the coast range lie in a northerly direction; and at 5 miles northward of the point, is Bold peak,\* upwards of 3,000 feet in height.

Abreast this peak are North and South Green islands near the shore, together nearly 4 miles in length; farther northward are two smaller islands.

**Pascoe channel**, between Green islands and the shore, is from one to 3 cables wide, with reefs on either side of it. Off a point on the mainland southward of the entrance, the reef extends 4 cables, and there is a rock awash with 7 fathoms close-to, immediately in the opening to the northward.

There is a 2-fathoms patch E. by S. one mile from the north extreme of North Green island.

**Current.**—In the month of June a current setting northward at the rate of  $3\frac{1}{2}$  knots an hour was observed in Pascoe channel.

**GREEN ISLAND BAY**, situated north-eastward of Green <sup>Var. 14° E.</sup> islands, has several low coral islands, with numerous reefs and sandbanks in it.

At Cliff point, a ridge of low hills, named the Barbakan range, joins the coast, and within these is a higher range, with double peaks and long flat spurs. Farther south-west the Four peaks on Cleopatra range show over the comparatively low conical-shaped hills which terminate the Bold peak chain.

**Barbakan.**—A small river discharges at  $5\frac{1}{2}$  miles north-eastward of Cliff point; the approach is shallow and the surf breaks heavily there at times. On the right bank, at half a mile up, is the village of Barbakan, which in 1850 contained a population of 100, protected by a stockade built on the summit of a hill overlooking it.

Lat.  $10^{\circ} 21' N.$   
Long.  $119^{\circ} 23' E.$

At 2 miles eastward of the river is Barbakan point, and close to the sea, at 5 miles beyond, is Bay peak, a conical hill 1,800 feet in height.

**High point**, is the bold headland forming the north-eastern limit of Green island bay.

**Mount Baring**, within High point, attains an elevation of 2,100 feet.

**Johnson island**, the south-easternmost island in Green island bay, lies 18 miles north-east from Bold point, and 4 miles from the shore. It is nearly a third of a mile in extent and partly surrounded by a reef, which on the western side projects 4 cables.

Lat.  $10^{\circ} 15' N.$   
Long.  $119^{\circ} 22\frac{1}{4}' E.$

A bank, consisting of sand and coral,  $1\frac{1}{2}$  miles in extent, east and west, dries at low water  $2\frac{1}{4}$  miles S.  $\frac{1}{4}$  W. of the island, close to the southern edge of which are depths of 12 to 14 fathoms. There is also rocky ground with 4 fathoms and 18 to 20 fathoms, mud, around, with the island bearing N. by W.  $\frac{1}{4}$  W., distant  $3\frac{1}{2}$  miles.

**Howley, Stanlake, Flat, and Shell islands** lie inshore of Johnson island; Howley, the south-western, is  $1\frac{1}{3}$  miles from the shore, with a reef between; there is a sandbank S. by W.  $\frac{1}{4}$  W.  $1\frac{1}{2}$  miles from Howley island.

Stanlake and Flat islands are the two largest in the bay, and there is a depth of 8 fathoms between them, decreasing to 2 fathoms off Cliff point abreast the latter island.

A sand patch lies  $1\frac{1}{2}$  miles eastward of Stanlake, and there is an islet between Johnson and Flat islands. Shell island lies 3 miles northward of Johnson island, between it and Barbakan. It has a shoal extending one-third of a mile from its north-western side, and a sand patch at 6 cables south-westward.

**Green island**, lies 6 miles E. by N.  $\frac{1}{4}$  N. from Johnson island; it stands on the western side of a quadrangular-shaped reef  $1\frac{1}{2}$  miles in length,

Lat.  $10^{\circ} 17' N.$   
Long.  $119^{\circ} 36' E.$

Var.  $1\frac{1}{2}$ ° E.

and nearly one mile in breadth, at the eastern corners of which are some rocks awash and a dry sandbank with a depth of 12 fathoms close-to.

**Reef island**, from the east side of which a coral shoal projects three-quarters of a mile, lies W.N.W.  $2\frac{1}{2}$  miles from Green island; midway between it and Shell island is a sandbank and reef.

The depths between these islands and reefs are 10 to 14 fathoms, mud, and they appear to decrease gradually to the shore.

**Hog island**, lying 3 miles northward of Green island, and the same distance from the shore, is 300 yards in extent, with a reef projecting 4 cables from the eastern side, and a rock awash, one mile east of it.

A sand bank, about a mile in extent, lies about  $2\frac{1}{2}$  miles westward of Hog island and nearly the same distance from the mainland; there is a depth of 6 fathoms between the sandbank and the shore reefs, which in this part extend out to the distance of one mile.

\*Lat.  $10^{\circ} 16' N.$   
Long.  $119^{\circ} 39' E.$

**Shoals.**—At 9 miles E.  $\frac{2}{3}$  S. of Green island is a coral reef,\* with apparently a depth of 3 or 4 fathoms over it, from which High point bears N.W. by N., distant  $8\frac{1}{2}$  miles; a 5-fathoms shoal is charted W.  $\frac{1}{2}$  N. 4 miles, and an 8-fathoms patch N.E.  $1\frac{1}{2}$  miles from the 3-fathoms reef. At  $2\frac{3}{4}$  miles N.E. by E.  $\frac{1}{2}$  E. from Green island, is a 5-fathoms patch, with 16 to 17 fathoms around; there is also a coral patch of  $4\frac{1}{2}$  fathoms on the same bearing, but 7 miles from Green island, and at  $3\frac{1}{4}$  miles south-east of the latter, two other banks, which probably have less water than that given on the chart, viz., 7 fathoms.

**Depths.**—The general depths, from 4 to 6 miles seaward of the group in Green island bay, and in the channels between the above-mentioned shoals, is from 16 to 24 fathoms, sand and mud; sometimes red coral is brought up with the lead.

\*Lat.  $10^{\circ} 23' N.$   
Long.  $119^{\circ} 34' E.$

**The COAST** beyond High point\* trends north-eastward for 12 miles to Endeavour point, which is low and densely wooded. Midway between is Squall point, from which a range extends northward, meeting the coast at the same distance on the other side of Endeavour point, having Drake peak, a sharp hill 1,300 feet in height, on the southern part, and a double peak 1,400 feet in height northward of it.

**Illan.**—Two miles northward of High point, where the low land joins the foot of mount Baring, is a small river, with a village similar to that of Barbakan, named Illan, on the right bank, half a mile from the entrance. The river water is fresh at the village. A coral spit extends nearly three-quarters of a mile from the south point of the entrance.

Lat.  $10^{\circ} 24' N.$   
Long.  $119^{\circ} 41' E.$

**Sand cays.**—Two reefs lie off this part of the coast. The outer, about  $1\frac{1}{2}$  miles in diameter, is very dangerous, has a sand cay in the centre, and lies  $4\frac{1}{2}$  miles from the shore, and E.  $\frac{2}{3}$  N.  $6\frac{1}{2}$  miles from High point.

The other,  $2\frac{3}{4}$  miles in-shore of it, has also a sand cay. Reefs and sand var.  $1\frac{1}{2}^{\circ}$  E. banks extend nearly 2 miles off the coast north-eastward of Squall point.

**DUMARAN ISLAND**, separated from Endeavour point by Cook channel, is about 16 miles in length by 7 miles in breadth, and about 600 feet in height. It is of irregular form, and has no remarkable features by which to distinguish it, the hills being of about the same elevation, and with the exception of a few in the neighbourhood of the settlement on the north shore, and near the north part of the island, are thickly wooded.

There is an inlet on the south-east side of the island 3 miles in length, with 5 fathoms water near the head; and at the eastern extremity of Dumaran is an island connected with the shore by a sandy isthmus. Eastward, nearly 6 miles from this island, is a small wedge-shaped island named Kambari or Trepang.

Lat.  $10^{\circ} 34' N.$   
Long.  $120^{\circ} 5' E.$

**Islets and shoals.**—Three small islands front the south-east side of Dumaran; Langoi or Christmas, the south-west and largest island, lies 4 miles east of the large inlet. At about  $1\frac{1}{2}$  miles S.W. from Langoi island is a 3-fathoms patch of coral, and there is also one of 4 fathoms at 8 cables N.W. of the same. The north-eastern of the three islands is named Kimitad or Wedge.

Off the south point of the inlet (Araceli bay) at the north-east extreme of Dumaran is a patch of 5 feet, half a cable in extent, situated with Langoi island, bearing S.  $4^{\circ}$  E., and Kimitad island, S.  $84^{\circ}$  E.

Between the above-mentioned islands and Dumaran, and also off the entrance of the inlet to the southward, the depth of water is 10 to 12 fathoms; but at  $4\frac{1}{2}$  miles south-west of Christmas island, abreast Green point, the south point of the large inlet, is a rocky bank with 4 fathoms water. Also, south-west of Green point, fronting an opening, is a  $2\frac{1}{2}$ -fathoms patch, lying  $1\frac{1}{4}$  miles from the shore, from which South hill, on the southernmost part of Dumaran island, bears W.  $\frac{1}{2}$  N.

Lat.  $10^{\circ} 28' N.$   
Long.  $119^{\circ} 53' E.$

At 2 miles, E. by S. from the extreme south point of Dumaran, there is a rocky head of 4 fathoms one mile off shore with a depth of 8 fathoms inside it. Barton point, the south-west extremity of Dumaran, has a bank with  $2\frac{1}{2}$  fathoms water, projecting  $1\frac{1}{4}$  miles to the westward.

Nearly midway between Barton point and the inner sand cay already noticed as lying off the coast between High and Endeavour points is a patch of 3 fathoms, and possibly less, with South hill, Dumaran, bearing E.  $\frac{3}{4}$  N., and Endeavour point, N.  $\frac{1}{4}$  W. The depths around are 12 to 15 fathoms.

**Settlement.**—The settlement of Dumaran lies  $4\frac{1}{2}$  miles northward of Barton point, at the head of a small bay, abreast Endeavour point.

Lat.  $10^{\circ} 32' N.$   
Long.  $119^{\circ} 45' E.$

Var.  $1\frac{1}{2}$ ° E.

The small fort stands on a hillock close to the landing place, a church forming part of the interior arrangements of it.

The village is prettily situated amongst some cocoanut trees, and there is a considerable tract of land under cultivation.

**Supplies.**—Rice, maize, sweet potatoes, tobacco, and cotton, are grown, both for the consumption of the inhabitants and for the purposes of traffic. Pigs, goats, and fowls are also plentiful. There is not any eligible watering place in the bay.

**Anchorage.**—Shelter from north-east winds will be found on the west side of Dumaran in from 9 to 12 fathoms, mud, S.S.W. of the bay, where the settlement is ; bearing in mind, however, that a reef extends  $1\frac{1}{2}$  miles in a southerly direction from the west point of it, and also that the western coast of the island from Barton point is fringed with coral, which at low water dries from 4 to 5 cables off. To avoid the end of the former danger, do not bring Drake peak to the southward of W.  $\frac{1}{4}$  N.

Small vessels may anchor in 4 or 5 fathoms east of the spit, about a mile from the fort ; but the bay is much contracted by reefs, and exposed to southerly winds.

Lat.  $10^{\circ} 30' N.$   
Long.  $119^{\circ} 44' E.$ 

**COOK CHANNEL**, between Dumaran island and the coast of Paláwan, is  $1\frac{1}{4}$  miles wide, and has its southern entrance between Endeavour point and a rocky spit with a sandbank on it, dry at low water, extending to the southward  $1\frac{1}{2}$  miles from the west point of Dumaran ; northward of this the channel lies between several small islands, which contract it to three-quarters of a mile in width. Its northern entrance opens into a bay which has been but partially sounded and which doubtless contains other shoals than those already discovered.

The depths in the south entrance of Cook channel are from 12 to 15 fathoms, mud ; amongst the islands they average 10 fathoms, increasing to 14 and 20 fathoms to the northward.

The tidal stream sets rapidly through the channel, and it should not be attempted by a sailing vessel, unless under favourable circumstances.

From Endeavour point northward, the coast of Paláwan assumes a different character, being fronted by islands and rocks, not one of which partakes of the features of those farther southward.

Lat.  $10^{\circ} 40' N.$   
Long.  $119^{\circ} 40' E$ 

Dampier point, 9 miles from the north end of Endeavour point, forms the western extremity of the bay before mentioned. Point peak, 960 feet in height, and others of less elevation lie within it.

The north-west and north sides of Dumaran have reefs upwards of 3 miles from the coast in some places, with deep water between. The north extreme of the island terminates in a white cliff with rocks awash just eastward of it. At  $2\frac{1}{2}$  miles north of this cliff point are Monk and Friar islands, an islet with a barren rock about 60 feet high, one mile W. by S.  $\frac{1}{4}$  S. of it.

**Islets and dangers.—South Channel island.**—Of the var.  $1\frac{1}{4}$ ° E. islands in the northern entrance of Cook channel, the three largest lie on the eastern or Dumaran shore in a north and south direction. South channel island is 2 cables west of the southernmost of these three, and is connected with it by a reef awash in some parts at low water.

**A rock awash** lies apparently in the centre of Cook channel, at Lat.  $10^{\circ} 32' N.$ , Long.  $119^{\circ} 43\frac{1}{4}' E.$  3 cables from the edge of the reef on the south-east side of South channel island, with the summit of the large island bearing N.N.E., distant three-quarters of a mile and Endeavour point W.S.W. the same distance.

A spit extends a quarter of a mile from the west side of the central island.

**Mayabacan or Goat island**, the northernmost on the eastern side of Cook channel, lies N.N.E.  $2\frac{1}{2}$  miles from South channel island ; it is 380 feet in height, and has a rocky head just detached from the north extremity.

A 3-fathoms coral patch lies W.  $\frac{3}{4}$  N. one mile from the summit of this island with depths of 15 to 16 fathoms close-to. At  $1\frac{1}{4}$  miles N.N.E. of Goat island is the commencement of a chain of reefs extending 3 miles in the direction of the north point of Dumaran.

**Reef and Bivouac islets.**—On the west side of Cook channel are four small and one larger island. The latter, 200 feet in height, lies nearly west about 2 miles from the centre island on the opposite side, and fronting it are Reef and Bivouac islets. The former of these is surrounded by coral, which, in a southerly direction, extends 4 cables from it, contracting this part of the channel to three-quarters of a mile in width. Bivouac islet, 160 feet high, at half a mile N.N.E. of Reef islet, is bold to approach, and has a rocky head on the north-east side, with a depth of 4 fathoms close to it.

**North Channel island** lies about half a mile north-west of Bivouac islet, and from it a reef projects 2 cables in a north-east direction ; there is a dry sand bank on the south-west side.

**Directions.**—To steam through Cook channel from the southward, steer for Endeavour point bearing N.  $\frac{1}{2}$  E. until the vessel is within 4 miles of it, which will lead eastward of the eastern sand cay and westward of the coral shoal of 3 fathoms in the fairway ; thence steer to pass within a short distance of the point to avoid the spit which dries off Dumaran on the opposite side of the channel. Proceed midway between South Channel island and the shore, and, having rounded the former at a convenient distance, steer N.N.E.  $\frac{1}{2}$  E., for the west extreme of Goat island ; when Reef islet bears West, edge more to the northward, to give a berth to the spit which extends from the west side of the central island. Do not pass more than half a mile westward of Goat island, which will clear the

Var. 1° E.

3-fathoms patch between it and the North Channel island. Having passed Goat island, keep it a little eastward of South, until White cliff point, the north extreme of Dumaran, bears East, to avoid the chain of reefs 3 miles in length, lying between the island and the latter point; then, if not bound to Ta Tai or any of the islands adjacent, proceed by passing westward of the Monk and Friar islands.

**KARANDAGA ISLANDS**, situated E.N.E. distant from 16 to 18 miles from Dumaran island, consist of two islands, and three islets or rocks.

**Dalaganem**, the southernmost island, is 3 miles in extent from north to south, and has a high precipitous conical head, connected with the south part by a low narrow isthmus; and a detached rocky head with an islet off, at its northern extremity.

Lat. 10° 43' N.  
Long. 120° 15' E.

**Madukang or Karandaga island**, 926 feet high, lies northward of Dalaganem, the channel between, with a depth of 10 fathoms, being 6 cables wide. The island is 1½ miles in extent, and has two precipitous rocky peaks projecting in a north and north-west direction forming its highest part, from which also a saddle shoulder slopes to the southward. Indong islet is connected with the south-east side of the island.

**Kauayan, or Bird islet**, is situated 3½ miles eastward of Karandaga; Kasirahan, or White islet, lies 2½ miles N. by W. of Kauayan. There are depths of 25 to 30 fathoms, close around the group.

**Tides**.—It is high water, full and change, at the Karandaga islands at 9 h. 30 m.; springs rise 6 feet.

Lat. 10° 43' N.  
Long. 119° 41' E.

**The COAST.—Pali or Barren island**, lying north-eastward of Dampier point, and separated from it by a channel 2 miles wide, with a depth of 23 fathoms, is a narrow island, 2½ miles in length, north and south, and 720 feet in height. It is of a rocky barren aspect, with comparatively few trees growing upon it.

The depths around the island are from 23 to 25 fathoms; but for a short stay a vessel might anchor on a 6½-fathoms coral patch, three-quarters of a mile off, or on one with the same depth distant 2½ miles; these are situated eastward of a small bay on the east side three-quarters of a mile from the south point of the island, where there is a depth of 11 fathoms at a cable from the beach.

**Shoals**.—There is a 3-fathoms patch, S. ¼ E. 8 cables, and one with the same depth E. by S. 1¼ miles from the south extreme of Pali island, the two being in line with Dampier point bearing S.W. by W. ¾ W. A patch of 4 fathoms is charted E. ½ N., distant 3½ miles from the south extreme of the island.

A shoal with a depth of 6 feet over it is situated 4½ miles N. 82° E. from the north point of Pali island; another similar shoal is situated about 1½ miles further eastward.

**Water.**—A stream in the small bay on the east side of the island,  $\text{Var. } 1^{\circ} \text{ E.}$  difficult to distinguish unless close to the beach, was the only eligible place discovered on this part of the coast for watering, which here is a tedious operation if not supplied with long hoses. Vessels should be prepared to quit the anchorage on the appearance of an easterly wind, as the swell, which usually precedes it, comes in suddenly.

**A patch** of  $2\frac{1}{2}$  fathoms is charted N.E. by E.  $\frac{2}{3}$  E., distant 10 miles Lat.  $10^{\circ} 40' \text{ N.}$  Long.  $119^{\circ} 51' \text{ E.}$  from the north extreme of Pali island; a similar patch was reported in 1898, at  $1\frac{1}{2}$  miles south-west of this position; they are probably identical.

**Tides.**—It is high water, full and change, at Pali island at 9 h. 30 m.; springs rise  $5\frac{3}{4}$  feet.

On Palawan island, immediately abreast Pali island, and to the northward of Point peak, is an inlet  $3\frac{1}{2}$  miles in length, with two islands at the entrance, the largest of which, Shadwell island,\* is  $1\frac{1}{2}$  miles from the shore. Lat.  $10^{\circ} 43\frac{1}{2}' \text{ N.}$  Long.  $119^{\circ} 37' \text{ E.}$

There are also three other islets farther up, with a depth of 5 fathoms close to them, and a small village at the head of the inlet. Two reefs, one with a sand cay on it, front the southern shore of the inlet, and rocks above water lie off the points under the peak at the entrance.

**A rocky patch**, with a depth of one fathom and deep water around, lies S.E.  $\frac{1}{2}$  S. one mile from Shadwell island.

**Ikadambanuan or South Tai Tai island** lies about 6 miles N.W. by N. of Pali island, and is separated from the south point of Tai Tai bay, by a channel barely a mile wide, with a depth of 18 fathoms. The island is 610 feet in height.

**Rocks.**—A rock awash lies rather more than three-quarters of a mile from its east side; and at the south-east extreme of the island is a spit, with an islet and a white rock near it; a sunken rock (P.D.) was reported, 1898, to lie 4 cables south-west of the south extreme of the island.

A small reef, with a depth of less than 2 fathoms over it, exists between Tai Tai island and the mainland.

From the point abreast South Tai Tai island a reef fronts the coast and the inlet south of it, extending  $1\frac{1}{2}$  miles from the shore of the latter, with 19 fathoms near the edge.

**Shoals.**—Midway between South Tai Tai island and Pali island is a bank nearly a mile in length, east and west, with depths of 3 to 4 fathoms, coral; its western edge lies N. by W.  $\frac{2}{3}$  W.  $1\frac{1}{4}$  miles from Starfield, an islet in the middle of the channel, 2 miles north-east of Shadwell island.

A shoal of large extent with a depth of less than 3 fathoms over it is situated  $2\frac{1}{2}$  miles N.  $15^{\circ}$  W. from the north point of Pali island.

A shoal, with a depth of about 3 to 4 fathoms, is reported to lie about 4 miles east of the north extreme of South Tai Tai. This neighbourhood being unsurveyed, requires special care when navigating, a good look-out aloft being essential.

Lat.  $10^{\circ} 55' N.$   
Long.  $119^{\circ} 32' E.$   
Var.  $1^{\circ} E.$

**TAI TAI BAY** is about 9 miles wide, between its extreme points, and 6 miles deep, affording good shelter in the south-west monsoon; the distance across Palawan island here in some parts does not exceed 4 miles.

A high range overlooks both shores, and that portion which separates the north-west part of Tai Tai bay from Bakit bay, has an abrupt shoulder 1,680 feet in height, and some sharp peaks on it, giving rise to the appellation of Sharks-fin range.

Four islands lie across the entrance of Tai Tai bay; Elephant, Castle, and Apulit, the three northern islands, as well as Old Castle point, the south point of Maitiaguit island, and Lion rock, lying nearly a mile S.S.E. of the point, are high precipitous rocks, of limestone formation, clothed with foliage, and similar in character to those of Bakit bay on the west coast.

Tai Tai bay has been only partially sounded. The western shore is fronted by coral, which in some places extends 2 miles off, with depths of from 10 to 17 fathoms close to the edge.

\*Lat.  $10^{\circ} 50' N.$   
Long.  $119^{\circ} 30\frac{1}{4}' E.$

Tai Tai fort is in the south-west angle of the bay.\*

The walls of the fort are 30 feet high, and mount several small pieces of ordnance. The fort had (before the late war) a garrison consisting of about 200 soldiers; the population then was about 600, under an Alcade or governor. Large tracts of land in the interior are under cultivation; and a foot-path, or bridle-road, communicates with Malampaya inner sound, on the opposite side of the island.

**LIGHT.**—From a pole in the fort, at an elevation of 45 feet above high water, a *fixed white* light is exhibited, visible in clear weather from a distance of 4 miles.

**Tides.**—It is high water, full and change, in Tai Tai bay at about 9 h. 30 m.; springs rise  $5\frac{3}{4}$  feet.

**Supplies.**—The usual supplies, such as pigs, goats, fowls, vegetables, &c., were to be obtained in moderate quantities.

Water is not plentiful, that is, such as can with facility be procured by ships' boats.

The mud and rocks dry some distance off the fort at low water; and there are several detached coral patches, lying upwards of a mile from the shore, with depths of 9 to 12 fathoms close-to.

At 2 miles northward of the fort is Tai Tai head, and  $3\frac{1}{4}$  miles beyond is a bushy island, just detached from the shore, with a boat channel between. A reef awash lies  $1\frac{3}{4}$  miles off a little southward of this.

Lat.  $10^{\circ} 58' N.$   
Long.  $119^{\circ} 29' E.$

**Polarikan.**—There is an islet on the north side of a small opening in the reef, 8 miles northward of Tai Tai, which opening leads to a rivulet of fresh water, and where, on a hill overlooking it, is Polarikan settlement prettily situated amongst some cocoanut trees.

In the north-west part of the bay,  $3\frac{1}{2}$  miles from Polarikan, there are some openings in the mangrove whence the shore in irregular outline trends eastward of Silanga.

**Kalabadian or North Tai Tai island.**—Kalabadian, the southernmost island fronting Tai Tai bay, lies nearly a mile northward of Ikadambanuan island; its formation contrasts strongly with Castle island, 750 feet in height, which is situated 8 cables N.N.W. of it. Elephant island lies about a quarter of a mile northward of Castle island, and has a reef awash at three-quarters of a mile to the eastward.

**Malatpuso or Snake rock,** about 60 feet high, lies to the eastward, distant about  $3\frac{1}{2}$  miles from these islands.

**Two-fathoms shoal.**—There is a bank with 2 fathoms, coral, about a mile in extent, lying with Snake rock S.E. by S., distant  $1\frac{1}{2}$  miles from its shoalest part.

**Three-fathoms shoal.**—A shoal of coral and sand, with a depth of 3 fathoms over it, about 2 miles in extent, lies with its centre bearing N.E. by E.  $\frac{3}{4}$  E., distant 5 miles from Snake rock, and E. by S. 3 miles from the south extreme of Binatikan island.

**Binatikan or Passage island,**  $1\frac{1}{2}$  miles in length north and south, lies in the offing of Tai Tai bay, 5 miles south-eastward of the south point of Maitiaguit island.

A rocky shoal with  $2\frac{1}{2}$  fathoms over it lies N.  $70^{\circ}$  E. 2 miles from the north point of Binatikan, and one with  $1\frac{3}{4}$  fathoms, on the northern side of the fairway, N.  $10^{\circ}$  E. from its west point with the south point of Kaisian bearing N.  $71^{\circ}$  E., distant 2 miles. There is a deep channel about 2 miles wide between these shoals.

A coral shoal, with a depth of  $1\frac{1}{2}$  fathoms over it, lies 2 miles W. by N.  $\frac{3}{4}$  N. from the north point of Binatikan island, with the south extreme of Apulit island bearing S.W. by W.  $\frac{3}{4}$  W.

**Apulit or Iguano** is the northernmost island in the bay; the passage between it and Elephant island,  $2\frac{1}{2}$  miles wide, with 27 fathoms water, is the best to enter the bay. From the south point of Apulit reef extends 2 cables; on the eastern side of the island a reef projects half a mile.

There is also a reef on which the *Royalist* struck,  $1\frac{1}{2}$  miles eastward of Apulit. It will be avoided by keeping the east extreme of Maitiaguit island to the westward of North, until the south point of Apulit bears West.

A 4-fathoms bank, half a mile in extent, with probably less water on it and steep-to, lies S.W.  $1\frac{3}{4}$  miles from the south point of Apulit island, with a shallow head about a mile westward of it.

**Dumbell** is a remarkable double-headed island with a rocky islet a cable off its south-east point. Several dangers lie between it and Apulit,

Var. 1° E.

and a coral patch with  $1\frac{1}{2}$  fathoms, lies N.N.W. nearly a mile from Dumbell island.

**The Silanga islands**, three in number, lie off the entrance of Silanga bay, each being surrounded by a reef barely a cable in extent; but 3 cables south-east of the centre island there is a shallow patch.

The depths in the neighbourhood of these islands are from 17 to 20 fathoms; between them and Apulit island there are 23 fathoms, and between the latter and Lion rock 24 fathoms.

Lat.  $11^{\circ} 1\frac{1}{2}'$  N.  
Long.  $110^{\circ} 34'$  E.

**Silanga bay**, formed by the south-west side of Maitiaguit island and the coast abreast, is 2 miles wide and nearly the same in length; Silanga settlement, comprising a stockade and a few houses built upon a small isthmus head, is situated on the north-west side, immediately under Silanga peak, which is 1,700 feet in height.

There is a boat passage at high water, about 2 miles in length, leading to Aletas de Tiburon or Sharks-fin bay.

Shelter from north-east winds may be had in Silanga bay in depths of 12 to 15 fathoms, taking care to keep rather on the eastern side, as the shore on which the settlement is situated, is fronted by coral reef to about half a mile off.

Old Castle point, the east extreme of Silanga bay, is the south extremity of Castle peak peninsula, the southern portion of Maitiaguit island.

Vessels proceeding into Silanga bay should haul close round Lion rock, a high islet (a steam vessel may pass between it and Maitiaguit island), in order to avoid Royalist reef, mentioned page 293, and enter northward of Silanga islands, keeping a good look-out for discoloured water.

**Off-lying islands.**—A group of four large and several smaller islands lie about 5 miles eastward of Maitiaguit island.

\*Lat.  $11^{\circ} 1'$  N.  
Long.  $110^{\circ} 44'$  E.

**Kaisian or Collinson island**,\* the south-east and smallest of the four,  $3\frac{1}{2}$  miles in circumference, has to the north-west of it Pinachiyan or Dome island, 1,020 feet in height, and Mabanen or Montero island, each being separated from the other by a channel from 2 to 4 cables wide.

**Malabuktun or Gimenez island**, the largest of the group,  $6\frac{1}{2}$  miles in circumference, lies one mile northward of Mabanen, and from it several islets extend in a northerly direction towards Knob, Triple, and Smith islands.

**Signal or Verde island**, about half a mile in length, lies one mile S. by W. from the south-west extreme of Pinachinigan island, with a 2-fathoms shoal of some extent in the passage between; a reef is charted as extending half a mile southward from Signal island.

Lat.  $11^{\circ} 8'$  N.  
Long.  $110^{\circ} 45'$  E.

Other islets and high rocks also lie about this group; the easternmost of these, Broken island, is cleft to its base at the north-east end; there is a small rock above water at a cable off the south-east face.

At 8 cables E. by N.  $\frac{1}{4}$  N. of a red cliff rock on Pinachiuyan island is a var. 1° E. rock awash.

There are also rocks awash, and others above water, midway between Frances and Malabuktun islands; and many of the points of the large islands have reefs and rocks projecting from them.

It is recommended not to take the passages between the islands forming this group, as they have not been thoroughly surveyed. The safest channel is inside it altogether (where also good shelter from the prevailing wind may be had), entering from the south between Maitiaguit and Latitude island, off the south end of Montero island, where the channel is  $1\frac{1}{4}$  miles wide; thence passing to the northward between Knob and Triple, and Boswell islands, where it is one mile wide.

The depths throughout this channel vary from 20 to 30 fathoms mud. Caution is requisite not to approach too near the north-east extremity of Castle peak peninsula, the south-east portion of Maitiagnit island, as some rocky ground extends  $1\frac{1}{2}$  miles in that direction from it.

**Shoal.**—Some islets lying on the north side of Maitiaguit island have also reefs off them; N.E.  $\frac{1}{4}$  N.  $1\frac{1}{2}$  miles from the easternmost of these, and S.  $\frac{1}{4}$  E.  $1\frac{1}{4}$  miles from Pigeon island, situated S.S.E.  $\frac{1}{3}$  E.  $2\frac{1}{4}$  miles from Knob and Triple eastern peak, is a coral patch. The east extreme of Knob and Triple island open eastward of Pigeon island, leads eastward of it.

**ALETAS DE TIBURON or SHARK'S FIN BAY,** close northward of Maitiaguit island, is  $2\frac{1}{2}$  miles wide at the entrance, and is formed on the north side by Batas or Knob and Triple island; this island is 5 miles in extent, has two remarkable peaks, and is connected at low water with the shore.

Reefs stretch nearly half-way from the northern shore across the entrance of the bay, which, together with the spit extending from the north extreme of Maitiaguit island contract the entrance channel to 8 cables. Three-quarters of a mile within, the depths are 16 to 18 fathoms. There is an islet one mile from the shore on the west side, and two others in the southern head of the bay.

Five islets are charted from 2 to 4 miles eastward and north-eastward of Batas island.

**Bagambangan**, 5 miles north-eastward of Batas island, is  $2\frac{1}{2}$  miles in extent, having at the south point a rocky lump, 60 feet high, three-quarters of a mile south-east of which is a rocky islet.

There is a small island, with a long sandy tongue on its south-east side, on the west face of Bagambangan island, and between the latter and Ilok island is a sandbank surrounded by a reef.

**Ilok or Austin island**, lying  $1\frac{3}{4}$  miles north-west of Bagambangan island, is 4 miles in extent, and has, off its north-east extreme,

Lat.  $11^{\circ} 7' N.$   
Long.  $119^{\circ} 43' E.$

Chart. 2,577  
[2,656].  
Var. 1° E.

Lat. 11° 15' N.  
Long. 119° 37' E.

a smaller island with a rock above water in the middle of the channel separating them. The western side of this island appears bold to approach; it has, however, been but partially sounded.

**Binulbulan or Cleopatra island** lies 3 miles south-west of Ilok island, and  $3\frac{1}{2}$  miles from the shore. It is  $2\frac{1}{2}$  miles in extent, has an undulating summit, and some rocks above water off the north point. A coral spit projects 4 cables eastward from the south point of the island, to the southward of which, at half a mile and at one mile from it, are two rocks above water.

**The Coast** of Paláwan between Batas island and Santa Monica, about 7 miles to the northward, is fronted by rocky ground, which in some places extends out upwards of a mile.

North and South rocks, above water and  $2\frac{1}{2}$  miles apart, lie off it, the latter being 2 miles from the shore, and nearly  $2\frac{1}{2}$  miles north of Batas; in a direct line between these rocks are two patches of 3 fathoms, coral, steep-to to seaward.

**Santa Monica settlement** is situated in a small bay abreast Ilok island and under East peak, the stockade being built on a small projecting head, with a few houses at the back amongst cocoanut trees. The population is said to be about 100.

**Darokotan bay**.—Darokotan point, forming the south extremity of the bay of that name, is  $2\frac{1}{2}$  miles northward of Santa Monica, and has a small rock close to it.

Lat. 11° 22' N.  
Long. 119° 31' E.

Darokotan island occupies a central position in this bay, about a mile from the shore, and has on its south side some reefs which stretch nearly two-thirds of the way towards Darokotan point. Reefs, awash and steep-to, also extend 8 cables in a northerly direction from the point.

In the northern part of the bay about one mile south-east of the opening between Kabuli and Paláwan, are the North and South Brother islets. The depth close eastward of them is 25 fathoms, and in the direction of Darokotan island, 12 fathoms, mud.

**Kalibangbagan or Hastings island**, situated about 8 miles eastward of the north point of Paláwan, is  $2\frac{1}{2}$  miles in length, north-west and south-east, and has several peaks, the highest being near its south extremity, where just off the point is an islet and some rocks awash. Northward of the island, between it and Square-top group off Malubutglubut island, are two peaked islets.

**LINAPAKAN ISLAND** is the largest of an extensive group lying between the north-east coast of Paláwan and the Kalamianes, distant 11 or 12 miles from the former. It is about 10 miles in extent east and west, and has on the north side two deep bays with several islets and rocks lying off the prominent points. In the eastern bay

are several steep conical heads; in the south-west corner is the settlement of St. Nicholas, comprising a stockade and a few houses. There is a depth of 19 fathoms at a mile from the settlement; but the approach to the bay has not been sounded, and no part of the southern face of the island has been examined.

Chart, 2,577  
[2,456]  
Lat.  $11^{\circ} 28' N.$   
Long.  $119^{\circ} 48' E.$   
Var.  $1^{\circ} E.$

North-north-eastward of Linapakan an almost continuous chain of islets and rocks extends to Kalamion or Kulion island, but they have not been surveyed, nor have the numerous passages between them been sounded.

**Malubutglubut (Observatory) island**, lying east-north-east 10 miles from the north extreme of Palawan, is the north-westernmost of the Linapakan group. It is 758 feet in height, and when first seen from the northward, appears as a conical hill. The island is  $1\frac{3}{4}$  miles in extent, and has at its north extreme a saddle head, with a slip or water-course down it, connected by a low neck of land, on either side of which are sandy bays.

**Observation spot**, a small rocky point, where observations were usually taken by the officers of the *Royalist*, in the bay on the west side of Malubutglubut island, is in the position noted.

Lat.  $11^{\circ} 30' N.$   
Long.  $119^{\circ} 39' E$

The channel between Malubutglubut island and Linapakan is barely  $1\frac{1}{2}$  miles wide, and has upwards of 30 fathoms water. A strong current (depending in velocity and direction on the prevailing winds) will be found usually setting through it.

**Nanga islands**, consisting of four islands and some peaked rocks, lie from  $1\frac{1}{2}$  to 2 miles off the south-west face of Malubutglubut island.

**Base reef**, lying N.W. by N. nearly  $3\frac{3}{4}$  miles from the high part of Malubutglubut island, is about 30 feet in length, and always visible; between it and the island are two rocks awash.

**Tides**.—It is high water, one day after full and change, at Malubutglubut island at 11 h.; maximum rise observed,  $5\frac{1}{4}$  feet.

**KABULAUAN ISLANDS** are a scattered group lying from 13 to 30 miles eastward of Linapakan, composed of two islands and several islets.

**Kabulauan, or Sombrero**, is  $2\frac{1}{2}$  miles in length, with a hill about 700 feet in height near its north-east point. On the south-west side there is a small bay bordered by a reef with depths of 4 to 11 fathoms. The north side of the island is foul. At the distance of about one mile from the south side of Sombrero there is a rock, which appears to be connected with the island by a reef covered with  $2\frac{1}{2}$  fathoms water. At 2 miles west of the north extreme of the island there is a patch of  $4\frac{1}{2}$  fathoms.

Lat.  $11^{\circ} 23' N.$   
Long.  $120^{\circ} 5' E.$

Chart. 2,577  
[2,650].  
Var. 1° E.

**Nangalao**,  $4\frac{1}{2}$  miles north-east of Kabulauan, is about 2 miles in length, and rises to a central hill about 500 feet in height. Two islets, joined to the south point by a reef, form a bay with depths of 5 to 11 fathoms. The channel between Nangalao and Kabulauan has not been sounded; there is an islet in the middle of it.

Lat.  $11^{\circ} 14'$  N.  
Long.  $120^{\circ} 16'$  E.

**Kanaron island**, lying 13 miles south-eastward from Kabulauan, is small, about 300 feet high, and bordered on the north side by reefs and rocks to the distance of one mile.

Solitario, 40 feet high, lies 5 miles N.E.  $\frac{1}{2}$  E. of Kanaron; and Salimbubug, 100 feet high, lies 4 miles N.N.W.  $\frac{3}{4}$  W. of Kanaron.

A rock is charted about 3 miles W. by N.  $\frac{1}{2}$  N. from Salimbubug, marked *E.D.*

**Passage.**—H.M.S. *Encounter*, in April 1880, passed from the Sulu sea to the China sea, westward of Linapakan.

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General chart, 967 [2,650].

## CHAPTER X.

THE KALAMIANES GROUP.\*—WEST COASTS OF MINDORO  
AND LUZON.

**The KALAMIANES.—General remarks.**—The Kala-  
mianes are a group of high islands lying between the north-east end of Paláwan and Mindoro, and extending between the parallels of  $11^{\circ} 39'$  and  $12^{\circ} 20'$  N., and the meridians of  $119^{\circ} 47'$  and  $120^{\circ} 23'$  E. Busuanga, the largest island of the group, is about 34 miles in length north-west and south-east, and 18 miles in breadth. It is irregular in form with numerous deep bays. The islands and reefs which front its north-east side form the western side of Apo West pass or Northumberland strait, the western channel of Mindoro strait.

These islands form, with the northern part of Paláwan and the Cuyos islands, a province, the capital of which is Tai Tai, page 292, in Paláwan. All these islands are, generally speaking, hilly and broken. The industry of the locality is in collecting edible birds' nests, honey, and wax; but cultivation is not practised to any great extent. The forests produce good timber for building or cabinet work. The population of the group amounts to about 16,400.

**Climate.**—The climate of these islands is in general hot and unhealthy; intermittent fevers and cutaneous diseases prevail, attributable in all probability to excessive moisture and the bad quality of the drinking water.

**Kalamion or Kulion island** lies off the south-west side of Busuanga, from which it is separated by a strait from 3 to 4 miles wide in its narrowest part, and in which are numerous islands and shoals. Kalamion is 19 miles in length, north-north-west and south-south-east, and its greatest breadth is nearly 10 miles. It is of irregular shape on the side next Busuanga, but its western side, which more concerns the navigator, is nearly straight. Close to the south-western extreme is Dikabaito island, which is distant  $9\frac{1}{2}$  miles from the nearest part of Linapakan, page 296.

There is a clear and safe passage to and from the China sea between Dikabaito and the Binalaba islands.

**HALSEY HARBOUR.**—Upon the west side of Kalamion island, about  $4\frac{1}{2}$  miles from its south point, is Alava island  $1\frac{1}{2}$  miles in length, 6 cables wide, and 423 feet in height, lying in the entrance of Halsey harbour. This capacious inlet extends in an easterly and north-easterly

\* The information relating to the portion of the Philippines described in this chapter is principally extracted from "Derrotero del Archipiélago Filipino," 1879; that relating to the Kalamianes group and adjacent island and dangers is chiefly by Captain J. Maclear, H.M. surveying vessel *Flying Fish*, 1885.

General charts, 967 [2,660] and 9,577 [2,666].

Chart. 3,401  
[3,504].  
Lat. 11° 46' N.  
Long. 119° 54' E.  
Var. 1° E.

direction for about 5 miles, with a general width of 4 to 7 cables, and depth from 10 to 20 fathoms, and affords good anchorage protected from all winds. Fresh water may be obtained in the cove on the southern shore eastward of Observation point.

A reef, with a chain of rocks above water upon it, projects  $3\frac{1}{2}$  cables southward of Alava, and reef also surrounds the island to the distance of from one to 2 cables, stretching out as a broad flat with a least depth of  $1\frac{1}{2}$  fathoms off the north-east end to  $3\frac{1}{2}$  cables from the shore.

The channel eastward of Alava is only one cable wide between the reefs on either side which, however, are steep-to and can be plainly seen in sunlight, being of sand and coral and of a reddish yellow shade; the depth in the passage is from 11 to 20 fathoms throughout. The east extreme of Alava bearing N. by E.  $\frac{1}{6}$  E. leads midway between the shore reefs in the narrow part of this channel.

There is no difficulty in entering Halsey harbour by Research channel, north of Alava; the shores on both sides are bordered by reef to the distance of about a cable and vessels should keep in the middle of the passage, especially when off the north-east end of Alava, and when passing Observation spot point where the shore reef extends out  $1\frac{1}{2}$  cables.

Lat. 11° 47' 12" N.  
Long. 119° 57' 10" E.

**Observation spot** is approximately in the position given in the margin.

**Tide.**—It is high water, full and change, at Halsey harbour at 10 h. 28 m.; springs rise  $2\frac{1}{2}$  feet.

**Saddle rock.**—At  $2\frac{1}{2}$  miles N.W. by W. from the north-west point of Alava island is Saddle rock or islet, surrounded by a reef and standing on the western extreme of a bank, nearly a mile in length, which has two rocks awash near its eastern end. Depths of 10 to 12 fathoms are found close to the bank except off its north-east end, where there is a patch of  $4\frac{1}{2}$  fathoms  $2\frac{1}{2}$  cables northward of the eastern rock awash.

**Off-lying islands and dangers.—Foul ground.**—The masters of several steam-vessels have reported that shallow water and detached reefs extend from 5 to 7 miles in places off the whole of the western coast of Kalamion; the charts show no soundings here. The master of the steamer *Mennon*, May 1901, however, reported that no dangers exist in this locality, except the small reef extending half a point from Saddle islet.

Several patches of 9 to 15 fathoms are charted from 20 to 30 miles westward of the island, with deep water around. Caution should be observed when navigating in the neighbourhood.

Lat. 11° 57' N.  
Long. 119° 49' E.

**Galok**, a long narrow island 541 feet high, lies close off the north-west extreme of Kalamion, surrounded by a reef which projects from its south-western end nearly a mile. Close off its northern part, and about a third its size, is Popotan island, from the western point of which a reef extends more than a mile south-westward.

From Popotan a chain of islands and dangers extends across the strait which separates Kalamion from Busuanga, and other islands and dangers extend several miles to the northward; the outer of these only concern the navigator. The following description of them is principally from Horsburgh.

**Nalaut, or Green island,** the westernmost island hereabout, is 242 feet high, covered with trees, and visible 15 miles off; it is surrounded by a coral reef, extending about one-third of a mile. About 2 miles northwest of the island is a coral shoal, having 5 fathoms and probably less water, with 9 fathoms close-to. East Nalaut island, 144 feet high, lies 3 miles E.N.E. of West Nalaut, with a depth of 23 fathoms between.

**Malajon, or Haycock island,** is a rocky island 753 feet in height, situated about 2 miles off the western part of Busuanga; it appears like a haycock when seen from the north or south, but from east or west it shows a flat top. The island is apparently formed of limestone, much underworn at the water's edge, and very steep, and is a good place for collecting edible birds' nests. Patches of 8 to 9 fathoms, with 20 to 30 fathoms between, exist to the distance of 6 miles westward of a line joining Haycock and Green islands, with overfalls in places.

**A shoal,** about one-third of a mile in extent, with depths of from  $4\frac{1}{2}$  to 8 fathoms over it, lies N.  $55^{\circ}$  W. distant 7 miles from Malajon or Haycock island, with Dimipak or High island bearing N.  $51^{\circ}$  E.

Discoloured water has been seen to the westward of this position, but was not examined.

**Elet,** a  $2\frac{1}{4}$ -fathoms patch, lies close westward of two islets, joined by a reef to a point of the north-west part of Busuanga, N. by E. distant about 4 miles from the Haycock.

**Pinnacle rock,** about 2 miles West of the north point of Busuanga, is a sharp rock above water, having a depth of 25 fathoms at about 2 miles, and 12 fathoms at one mile westward of it.

**Dimipak, or High island,** lies about 2 miles northward of the north point of Busuanga. It is not quite 2 miles in extent, and the channel between it and Busuanga does not appear to be free of danger, as some rocks were seen above water eastward of the island.

**North - west or Dichilem rock.**—About a mile north-westward of Dimipak island are rocks above water, one of which, Sail rock, 140 feet high, is remarkable; and  $1\frac{3}{4}$  miles north-westward of this lies a large black rock, named North-west rock or Dichilem, with 38 fathoms between. About 2 miles N.N.E. of Dichilem is a coral patch of 8 fathoms.

**Lena shoal.**—A shoal with two heads, and an estimated depth of 5 to 6 fathoms was reported in 1902 by the Master of the Norwegian S.S. *Lena*, situated  $9\frac{1}{2}$  miles S.  $81^{\circ}$  W. from North-west rock.

Chart, 3,401  
[3,504].  
Lat. 11° 46' N.  
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**North-west or Dichilem rock**.—About a mile north-westward of Dimipak island are rocks above water, one of which, Sail rock, 140 feet high, is remarkable; and  $1\frac{3}{4}$  miles north-westward of this lies a large black rock, named North-west rock or Dichilem, with 38 fathoms between. About 2 miles N.N.E. of Dichilem is a coral patch of 8 fathoms.

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Chart, 967 [2,650].

Var. 1° E.

Lat 12° 29' N.

Long. 120° 1' E.

**Kolokoto, or North rock,** is the north-western and highest of four large black rocks, which appear as one when seen bearing S.E. by E. or in an opposite direction; it was estimated to be 100 feet high. Kolokoto is the northernmost of the islands which lie on the north side of Busuanga, and may be seen from a distance of 13 to 14 miles.

The depths northward and eastward of these islands are very irregular, 17 to 30 fathoms, with patches of 5 and 8 fathoms, and it is necessary to be on the look-out for shallow water when navigating in this locality.

A patch of 5 fathoms is shown on the charts 10 miles N.  $\frac{1}{4}$  W. of Dichilem rock. H.M.S. *Flying Fish* anchored on this bank, which is of small extent, and sounded over it in boats, but found nothing less than 10 fathoms, with 25 to 30 fathoms around.

**Tanobon island**, standing on a reef about 2 miles in length north-east and south-west and one mile in breadth, lies about 3 miles south-eastward of Dimipak island. About midway between Tanobon and Dimipak there is a submerged rock.

**Dumunpalit (Turret) island**, situated 7 miles south-eastward of North rock, is 816 feet high, with several detached rocks about it, and a hummock on its south-west point, somewhat like a turret.

**Nanga islets**, 15 miles S.E. by E.  $\frac{1}{2}$  E. of North rock, are two wooded islets with sandy beaches, the largest being 344 feet high. About 1 $\frac{1}{2}$  miles N.N.E. of the islets is a black rock above water on the reef which surrounds them.

**Kamanga islets**, south of Nanga, are about 400 feet high, and cliffy; the chart shows them to be surrounded by a reef.

Lat. 12° 19' N.  
Long. 120° 20 $\frac{1}{4}$  E.

**Tara island**.—When seen from the northward this island shows a triple peak at its north-west end; while its southern part looks like a separate island, saddle-shaped. From the eastward the island appears of uniform height. The southern peak is 730 feet high, and the northern one 560 feet. On the south-west side there is good anchorage in a depth of 10 fathoms in a gap in the reefs which extend westward from the island, in some places to a distance of half a mile. From the anchorange, Kamanga islets bear W.  $\frac{3}{4}$  N.; and the western point of Lagat islet S.  $\frac{3}{4}$  W.

**Lagat** is an islet 334 feet high, surrounded by a reef, with a narrow passage between it and the reef off the south end of Tara.

**Reefs**.—A patch of 3 fathoms lies West 1 $\frac{1}{2}$  miles from the south end of Tara; the depths about the northern end are irregular; a patch of

6 fathoms lies between Tara and Nanga ; and a patch of 9 fathoms lies Chart, 967 [2,650].  
Var. 1° E. N.  $\frac{1}{2}$  W. 8 miles from the northern end of Tara.

**Bantak island**, 800 feet high, is fairly well cultivated ; high rocks Lat. 12° 14' N.  
Long. 120° 22 $\frac{1}{4}$ ' E. lie off its north and south extremes.

**Kalanhayaun island**, flat-topped, and 500 feet high, is connected with Bantak by a reef.

**Lubutglubut island**, 660 feet high, appears inaccessible ; north of it a reef extends to the distance of one mile, with rocks above water. A group of rocks, 380 feet high, lies 1 $\frac{1}{2}$  miles south of Lubutglubut.

**The east coast of Busuanga** is formed by a range of hills having an average height of 1,200 feet. The most conspicuous among them, seen from the northward, is a three-headed peak 1,880 feet high. Mount Tundalara, southward of it, 2,152 feet in height, has a smooth summit with a small knob on it, not visible from the northward. Over Kokonongan point there is a conspicuous cone 1,300 feet high.

**Minanga bay**, south-eastward of Kokonongan point, is blocked by islands and shoals. From Alonon point, southward of the bay, a bank of coral extends 3 miles off, with depths of 5 to 10 fathoms, shoaling towards the coast.

**Port Borak** is reported to be very narrow, but sheltered by the Lat. 12° 3' N.  
Long. 120° 18' E. islands Dinaran and Mataya, and to afford anchorage in 2 $\frac{1}{2}$  to 9 fathoms.

**Dinaran island** is saddle-shaped, with two peaks about the same height, 550 feet ; it is surrounded by a reef, which extends half a mile on all sides, except the western, which is clear.

**Mataya island**, lying 1 $\frac{1}{2}$  miles south-eastward of the above, is situated in the middle of a rocky shoal, nearly 3 miles in extent north and south, which is separated by a narrow passage from the reef that borders Dinaran island.

**Dibatuk island**, on the northern side of the eastern entrance to Lat. 11° 58' N.  
Long. 120° 18' E. Koron passage, is about 300 feet high. H.M.S. *Flying Fish* anchored in the bay north of Dibatuk in 17 fathoms, with the summit of that island bearing S.S.W.  $\frac{1}{2}$  W., and a rock off the east point of Busuanga E.  $\frac{1}{2}$  S. On entering this bay the vessel passed over a ledge of 4 fathoms, extending half a mile from the east point, so narrow that the cutter sounding ahead of the ship missed it.

**Koron island** is rocky, precipitous, and about 1,200 feet high. Its south end terminates in a sharp point, named Kalis, and is steep-to. About the middle of the eastern coast there is a shoal of sand and coral, covered by 5 $\frac{1}{2}$  fathoms ; and another shoal, of 3 $\frac{1}{2}$  fathoms, lies midway between Koron and Dibatuk.

**Delian island**, situated 3 $\frac{1}{2}$  miles north-east of Kalis point, is Lat. 11° 51' N.  
Long. 120° 18' E. 450 feet high. The shores are steep-to, with the exception of some rocks

Chart, 944 [2,657]. off its southern end, and a small reef on its north-east side. On the west Var.  $1^{\circ}$  E. side there is a white sand beach, with a short spit.

Lat.  $11^{\circ} 59' N.$   
Long.  $120^{\circ} 15' E.$

**Koron passage**, between Koron island and Busuanga, is used by the steamers trading between port Kulion and Manila. It is sinuous and narrow, having a greatest width of a third of a mile, with depths of 15 to 25 fathoms. The chart shows patches of  $2\frac{1}{2}$  and  $4\frac{1}{2}$  fathoms in the fairway.

**Directions for Koron passage.**—Coming from the eastward, vessels should keep on the Koron shore, which is steep-to, and when the north point of Koron is rounded the islet Makinit should be kept aboard. Then the north-west coast of Koron island should be followed, giving a berth to the islet  $1\frac{1}{2}$  miles eastward of Balolo point, from which a reef extends westward  $1\frac{1}{2}$  cables, as well as to the reef which extends nearly 2 cables off from Balolo point, and also avoiding the reef that projects south-eastward 4 cables from the south-east point of Uson island.

Lat.  $11^{\circ} 48' N.$   
Long.  $120^{\circ} 14' E.$

**KULION or KORON BAY** is the name given to the great bay included between the islands Koron, Busuanga, Kulion, and Bulalakao. The southern entrance is between Kalis point and Guintungauan islet, which lies on the edge of the great reef that extends east-north-east from Bulalakao.

**Guintungauan islet**, is about half a mile in extent and 153 feet high; a ledge of sand and coral projects three-quarters of a mile E.N.E. from it, and has 9 fathoms on its end.

**Shoals.—Animosa rocks**, lying in the track from Kalis point to Kulion point, are two rocks, 3 feet and 8 feet high, with Piedra Blanca nearly in line with Dunaun island, bearing about W. by N., and distant  $1\frac{1}{2}$  miles from Piedra Blanca.

A shoal of less than one fathom is shown on the chart as lying N.W. by N.  $5\frac{1}{2}$  miles from Kalis point, and one mile from the coast of Koron.

A coral shoal, of small extent, with 3 fathoms water and 20 fathoms close around, lies with Kulion fort bearing W.  $\frac{1}{2}$  N. and the eastern side of Chindonam island N. by W.  $\frac{1}{2}$  W.; a larger reef, which generally breaks, and is marked by a beacon with top-mark, lies off the entrance of port Kulion, about 2 miles E.  $\frac{1}{2}$  N. from the fort. A reef extends nearly 7 cables southward of the east end of Chindonam island.

Lat.  $11^{\circ} 54' N.$   
Long.  $120^{\circ} 1' E.$

**Port Kulion** is a sheltered inlet on the north-east coast of Kulion island, in Koron bay; it is 6 cables in length, but its available width is contracted to one cable by reefs on both sides; the reefs are marked by beacons with topmarks. The town of Kulion, on the north side of the port, consists of about 100 houses, built on posts, and has about 500 inhabitants; it has a fort and a church.

**LIGHT.**—From the fort on the northern side of entrance to port Kulion a *fixed red* light is exhibited, visible in clear weather from a distance of 7 miles.

**Anchorage.**—There is good sheltered anchorage, in 9 fathoms, south of the mole, but it is necessary to moor as the place is confined; vessels 200 feet in length should secure head and stern. Anchorage can also be had east of the fort in a depth of 15 fathoms, mud.

Chart, 944 [2,27]  
Var. 1° E.

**The trade** consists of tobacco, turtle-shell, trepang, pearl shell, and birds' nests.

**Supplies.**—Fowls, pigs, and cattle are procurable, but not abundant. Water can be had from a well in the little bay north of the town.

**Communication.**—A small steam vessel visits the port once a month, on her way from Manila to Cuyo and Samboanga, and again on her return to Manila.

**Port Uson,** on the south coast of Busuanga, lies between Uson island and the shore; it is spacious and offers good sheltered anchorage in depths of from 7 to 10 fathoms, but the entrances at either end of Uson island are narrow.

Lat. 12° 0' N.  
Long. 120° 9' E.

The eastern entrance is  $1\frac{1}{4}$  cables wide, with 4 fathoms least water; the western entrance is about the same width, but with not less than 10 fathoms in the fairway.

Uson island is 4 miles in extent east and west, of irregular shape, and low, with several hills, the highest of which is elevated 672 feet. There are some islets near it, and a reef surrounds the island to the distance of one to 2 cables, except at the south-east point where it projects 4 cables.

**DIRECTIONS.**—Trading craft from the eastward approach port Kulion and port Uson by Koron passage, before mentioned, but it requires local knowledge.

To enter Kulion bay from the southward, approach with Kalis point bearing North and when one mile from the point steer N.W.  $\frac{1}{8}$  W. for Tangat island, which is 1,200 feet high and easily recognised. There is a conspicuous gap in the ridge of Koron island, distant about  $1\frac{1}{2}$  miles from its southern extremity, which if kept astern bearing E. by S. will lead clear of all dangers up to the old fort of Kulion port.

**Western channel.**—The passage out westward is between Kulion and Busuanga, and presents no difficulty, but it has not been surveyed; the islands on both sides of the passage are only sketched in on the chart, so that considerable care is necessary when navigating it.

Leaving port Kulion, a course should be steered to pass between the reef in the middle of the bay and that extending southward of Chindonam island, both of which are generally visible and break with little sea; thence to give the east coast of Chindonam a berth of half a mile, to clear a reef which extends more than 3 cables eastward of that island. When in the centre of the channel between Chindonam and Tangat, a course should be steered for the south part of Luzon islet, westward of Tangat, and

Chart, 944 [2,657]. that island should be kept aboard to avoid the reef off the north-east side of Marili island. From abreast the west point of Luzon, a N.W. by W.  $\frac{1}{2}$  W. course clears all danger till a white rock, about 4 feet high, is seen in the middle of the channel between Lajo and Kalumbajan, the island north of Lajo. This white rock should then be steered for, bearing West, until Dikalatan, the island west of Lajo, bears S. by W., then a N.W.  $\frac{1}{2}$  W. course should be steered for the east extreme of Malbinchilao, the island south-west of Malkatop, passing about one cable eastward of it.

The summit of Tangat island in line with the north end of Malbinchilao, bearing E. by S.  $\frac{1}{2}$  S., leads southward of a 3-fathoms patch, situated southward of Maltatayok.

**Islands in the western channel.**—Chindonam is wooded with a rounded summit 400 feet high. Tangat is black, rugged, and steep, rising to a peak 1,200 feet high. Luzon islet is low; a coral reef extends about 2 cables south-east of its east end. Marili is about 300 feet high, and thickly wooded. Dimanglet, like all the islands, is covered with trees to the water's edge; it is about 250 feet high, and is fringed on the north side by a coral reef.

Lat. 12° 0' N.  
Long. 119° 56' E

Lajo is 450 feet high, and has a cone-shaped summit. Dikalatan is low, with a white beach on the east side. Malkatop is 150 feet high, and apparently extends half a mile more southward than is shown on the chart. Malbinchilao and Maltatayok are each 150 feet high; the latter has a white sand beach and spit on the east side, and low cliffs on the west side.

Lat. 11° 35' N.  
Long. 120° 4 $\frac{1}{2}$  E

**Islands south-east of Kulion.**--**Tres Reyes**, a group of small rocky islets, lie about 7 miles S.E. by E. from Dikabaito, and nearly 5 miles S. by W. of Kanipo.

Lat. 11° 34' N.  
Long. 120° 13' E

A rocky shoal, coral and white sand, on which a depth of 3 fathoms probably exists, lies S. 83° E., distant 8 $\frac{1}{2}$  miles from the northernmost of the Tres Reyes islands, with the largest of the Malaposo group bearing N. 9° W.

**Kanipo** is a small and comparatively verdant island situated 7 miles eastward of Dikabaito; its northern half is surrounded by a reef nearly half a mile in width.

A 5-fathoms shoal is charted at the distance of 1 $\frac{3}{4}$  miles south-eastward of Kanipo.

**Kalumbuyan**, nearly 2 miles north-east of Kanipo and encircled by reef, has a small islet off its south-west extreme; this island has a distinctive cone-shaped peak of a reddish brown colour.

Lat. 11° 43' N.  
Long. 120° 11 $\frac{1}{2}$  E

**Malaposo islets** comprise a small group of rocks standing upon a reef situated 3 $\frac{1}{2}$  miles E.N.E. from Kalumbuyan, and 2 miles from the south-east end of Bulalakao. The largest islet is about 175 feet high,

cone-shaped, composed of rock and clay of a reddish brown appearance, and var. 1° E. is the most conspicuous mark in the vicinity.

A 4½-fathoms shoal, about 3 miles in length north-east and south-west, lies on the southern side of a line adjoining Malaposo and Kalumbayan.

For islands and dangers south-eastward of a line joining Nangalao island and Aguirre bank, see Eastern Archipelago, Part I.

**SHOALS EAST AND SOUTH-EAST OF THE KALAMIANES.**—**Beta shoal**, of 6 fathoms, with 20 fathoms close-to, lies 7 miles S. by E. of Delian island.

**Alpha shoal**, with a depth of 6 fathoms, and 14 fathoms close-to, lies 4 miles E. by N. of the north end of Delian.

**Aguirre bank**, E.S.E. 17 miles from Delian island, is 1½ miles in extent; the least water on it is 4½ fathoms. Lat. 11° 48' N.  
Long. 120° 34' E.

**Narvaez bank**, with 4½ fathoms least water, lies with Kalis point bearing West, distant about 11 miles.

**Magallanes bank**, the southern end of which is 1½ miles N. by E. of Narvaez, is nearly 3 miles in length. From the position of least water, 1½ fathoms, on the northern end, Kalis point bears W. by S. ½ S. distant 12½ miles. Lat. 11° 52' N.  
Long. 120° 27' E.

**Framjee bank**, on which the British ship *Nerwanjee Framjee* is reported to have touched in 1878, was examined by the boats of H.M.S. *Flying Fish*, but nothing less than 5 fathoms was found. From the position of least water, the islet Lubutglubut, south-west of Kalanhayaun, bears N.W. ¾ N., and the summit of Delian S.W. by W. The bank extends about 3 miles in a south-west and north-east direction, has a general depth over it of 8 to 13 fathoms, and 40 to 50 fathoms around.

**MINDORO STRAIT.**—This wide strait, separating the Kalamianes from Mindoro island, is one of the most frequented channels for sailing vessels which leave Manila for India towards the end of April, and throughout the south-west monsoon period; and at all times of the year from the ports of China to Australia.

It is divided into two passes by Apo island and reef.

**Apo West pass, or Northumberland strait**, is 19 miles wide between Apo island and reef and the islands outlying Busuanga, and is deep throughout the fairway.

Hunter and Merope rocks lie in the northern entrance.

**Hunter rock**, on which the sea breaks, consists of a rocky ledge 2 cables in extent with a patch of 1½ fathoms on its south extreme; it has depths of 18 to 40 fathoms around. From the rock, mount Kalavite bears N. by E. ¼ E., and Apo island E. ½ S., distant about 12½ miles. Lat. 12° 40' N.  
Long. 120° 11' E.

Var. 1° E.

**Merope rock**, on which the sea breaks, lies  $5\frac{1}{2}$  miles north-east of Hunter rock, and consists of a ridge  $1\frac{1}{3}$  miles in extent north and south, and half a mile wide; the least depth is  $2\frac{1}{2}$  fathoms, and there is no bottom at 90 fathoms within a quarter of a mile. From the rock, mount Kalavite bears N.  $\frac{3}{4}$  E., and Apo island E.S.E.

**Weather.**—Land and sea breezes were experienced here in March, the latter from West and S.W., with the tidal stream or current setting northward; land and sea breezes prevailed also to the westward of the Kalamianes. The set of the current depends chiefly on the prevailing wind; a current setting south-eastward at the rate of 0·6 mile an hour has been observed.

Lat.  $19^{\circ} 40' N.$   
Long.  $120^{\circ} 24' E.$

**Apo island and reef.**—Apo island is about half a mile in extent, covered with trees, and visible from a distance of about 10 miles. White beaches front its north and east sides, and the reef surrounding the island extends about half a mile in places. It is separated from Apo reef by a narrow channel with a depth exceeding 90 fathoms. The island lies about 22 miles westward of Dongon point, the nearest part of the coast of Mindoro, and nearly the same distance from Tara island, the nearest of the islands outlying Busuanga on the western side of the channel.

Apo reef is about 10 miles in length in a north-north-west and opposite direction by about 6 miles in breadth. Near its western edge is Menor islet, a barren, black rock, about  $1\frac{1}{2}$  miles eastward of Apo island. Towards the eastern edge of the reef are other rocks above water, visible some miles off. At low water many small rocks are dry on the reef, particularly along its north side; the whole of the reef is steep-to.

**LIGHT.**—A group flashing light about *every ten seconds*, thus:—*white* flash, eclipse, *five seconds*; *red* flash, eclipse, *five seconds*; is shown at an elevation of 134 feet above high water from Apo island; it is 113 feet above the ground and should be visible in clear weather from a distance of 17 miles.

**Apo East pass** is  $14\frac{1}{2}$  miles wide between Apo reef and the nearest part of the coast of Mindoro; discoloured water with tide-rips have been observed in places some 7 miles off the coast between Dongon point and the Ambolon group, but soundings in one gave no bottom at 100 fathoms; there are no known dangers in it.

**Discovery bank**, in the fairway of Apo East pass, was surveyed in 1872 by the Spanish surveying ship *Mindoro*, which anchored on it several times. It is  $1\frac{1}{4}$  miles in length, north and south, and very narrow; the least water on it is 9 fathoms. The sea does not break on the bank, nor is it marked by any discoloration of the water. From the centre of the bank, the northernmost of the two Pandan islands off Mindoro, bears N.N.E.  $\frac{1}{4}$  E.; mount Kalavite, N. by W.  $\frac{1}{2}$  W.; and Apo islet W.  $\frac{1}{4}$  S.

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General chart, 2,577 [2,656].

**Sarraceno or Saracen bank** is about  $1\frac{1}{2}$  miles in extent from Chart, 971 [2,658].  
Var.  $1^{\circ}$  E. north to south, and the same from east to west, with a least depth of 14 fathoms, with mount Ilin bearing N.E. by E.  $\frac{1}{4}$  E., distant 16 miles. The shallow part is of red coral, but as the depth increases the character of the bottom alters, and at 50 fathoms it consists of coarse sand and gravel.

**Leonidas shoal**, about  $3\frac{1}{2}$  miles in length north and south, and Lat.  $12^{\circ} 4' N.$   
Long.  $120^{\circ} 52' E.$   $2\frac{1}{2}$  miles wide, is composed of coarse sand with shells and coral. From the position of least depth, 8 fathoms, the northern end of Ambolon appears well within the northern end of Ilin bearing  $N. 34\frac{1}{2}^{\circ}$  E., the former distant 12 miles; and the south point of Ilin N.  $66^{\circ}$  E.

**Directions.**—Vessels navigating Apo Eastern pass should follow both day and night, the pecked line marked on the chart, which line leads about 4 miles westward of Dongon point and the Pandan islands. Apo reef should be avoided as the lead will give no warning of approach to it, and the reef does not always break, but bearings of Apo island and the Pandan islands, and other objects, will enable the position of a vessel to be fixed.

**MINDORO ISLAND, WEST COAST.**—Very few soundings have been taken off the west coast of Mindoro, but the water is found to be deep close-to in many spots; for vessels passing through Mindoro strait there seems to be no necessity for closing the shore.

Some high ranges of mountains extend throughout Mindoro; one of the peaks, mount Halcon, situated at the northern part of the island, is 8,865 feet in height.

**Pandarochan bay**, between Burankan and Ilin points, the south extremes of Mindoro and Ilin islands, is safe throughout, affording good anchorage and shelter from northerly winds at the mouth of the strait between those islands, in a depth of 10 to 12 fathoms. Garza island and its extensive shoal also offer shelter from strong easterly winds.

The strait between Ilin and Mindoro is free from danger, but a small rocky shoal with a depth of  $1\frac{1}{2}$  fathoms lies at its northern entrance situated half a mile N.N.E. from the north-east point of Ilin. Owing to the prevalence of light airs in this channel it should not be attempted by a sailing vessel without a fair wind. Caution must be used when approaching Pandarochan bay from the northward by this strait, for the water on the Mindoro side, off Kominahuet point, shoals suddenly to 3 fathoms. Keep the channel well open, therefore, borrowing rather on Ilin until Garza island is nearly locked in by Burankan, the eastern point of the bay; then haul eastward, anchoring in 12 fathoms.

Water may be obtained in Lalaugan bay.

Chart, 971 [2,656]. **Garza island**,  $2\frac{1}{2}$  miles westward of Burakan point, is a low and sandy islet covered with trees, and encircled by a reef which extends 2 miles southward with depths of  $2\frac{1}{2}$  fathoms in places.

Lat.  $12^{\circ} 3' N.$   
Long.  $121^{\circ} 7\frac{1}{2}' E.$

**Dominga shoal** (position doubtful), charted as in margin, about 6 miles southward of Ilin and in the approach to Pandarochan bay, is reported by the natives of that island to have a least depth of  $3\frac{1}{2}$  fathoms, sand and rock. It is stated to be 2 miles in extent.

**Ilin island** lies parallel to the south-west part of Mindoro, is 10 miles in length and from  $1\frac{1}{2}$  to 4 miles in breadth. The south extreme is bold-to on all sides. Mount Ilin, on its north end, is about 850 feet in height.

Northward of the town of Ilin a spit extends  $1\frac{1}{2}$  miles from the shore with a bank beyond it, from the outer edge of which mount Ilin bears E. by N., distant about  $3\frac{1}{2}$  miles.

Lat.  $12^{\circ} 14' N.$   
Long.  $121^{\circ} 0\frac{1}{2}' E.$

**Ilin town.—Anchorage.**—The town of Ilin, on the west side of Ilin island and one mile northward of Ambolon, numbers about 500 inhabitants. A reef extends half a mile seaward, off which good anchorage will be found in a depth of 10 fathoms.

The depths appear to be very irregular, and there is a small 4-fathoms patch off the entrance to the boat passage.

**Supplies.**—A channel, staked by the natives, leads up to the settlement, where a stream discharges into the sea; but much sweeter water was found trickling over a cliff just round the town point to the southward, to which boats have easier access. Fowls, eggs, grain, and vegetables were procured at reasonable prices.

**Ambolon island**, westward of Ilin island, is about 3 miles in length and  $1\frac{1}{2}$  miles in breadth; its north and south extremes are from 400 to 550 feet in height. The dangers on the seaboard side of this island are all visible, and easily avoided.

Lat.  $12^{\circ} 9\frac{1}{2}' N.$   
Long.  $121^{\circ} 1' E.$

**A shoal**, nearly a mile in diameter, lies three-quarters of a mile S.S.E. of the south point of Ambolon island; a rock above water near its south-west end sufficiently guards it.

The channel between Ambolon and Ilin is navigable by vessels under steam or with a fair wind; a patch of  $2\frac{1}{2}$  fathoms lies in the southern fairway, and there are others of about 4 fathoms, for which see the chart.

**Donjon and Manadi rocks.**—Donjon rock, 4 miles north-westward of mount Ilin, lies  $4\frac{1}{2}$  miles W.  $\frac{1}{2}$  S. from Mangarin point; it is dry at low water, is surrounded by reef to the distance of one-third of a mile, and there is a detached reef half a mile south-west of it, not thoroughly examined.

Nearly midway between Donjon rock and Mangarin point lies Manadi rock, dry at low water, also surrounded by a reef ; between it and the point is a sunken reef. These reefs are all steep-to.

Charts, 971  
[2,658],  
949 [2,659].  
Var. 1° E.

**Mangarin bay**, 2 miles north of Ilin island, is about one mile wide in its entrance, where there are depths of about 3 fathoms, whence it shoals gradually to the settlement at its northern head. Mangarin peninsula and point terminate in a sandy spit, projecting eastward about a quarter of a mile. Boats only can reach the settlement, which numbers about 1,900 inhabitants, and is one of the principal settlements on Mindoro. The water is bad, and the climate unhealthy on account of its marshy surroundings. A limited supply of stock is obtainable.

The coast, from Mangarin, trends north-westward for 35 miles to Sablayan anchorage, and is generally low with sandy beaches. The low land extends a considerable distance inland, where it is backed by ranges of mountains. About 14 miles north-westward of Mangarin is Lumintau point, with a reported small shoal (E.D.) at half a mile to the north-westward.

**Iriron bay**, about 6 miles northward of Lumintau point, affords good anchorage for small craft during the north-east monsoon ; a village is situated on the north side of a small river, but no supplies could be obtained.

**Dongon bay** is situated 8 miles northward of Iriron bay, eastward of a low sandy point of the same name ; vessels can anchor here in front of the low sandy shore, protected from northerly winds.

**Sablayan anchorage**, 6 miles northward of Dongon point, is 8 cables wide between Sablayan point and the coast to the eastward, but the available space is reduced one half by reefs on both sides, and the northern part is filled by a reef enclosing a lagoon 4 to 5 fathoms deep to which there is a narrow entrance. Anchorage may be obtained in 12 fathoms with the mound on Sablayan point bearing West, at the distance of a quarter of a mile from the beach ; and in a depth of 9 fathoms, further in, with the mound bearing W. by S., but caution is necessary as the reefs do not show well. The inner lagoon is only suitable for native craft.

Sablayan town, on the western side of the anchorage, contains about 1,600 inhabitants, and there is a church and school. Fowls, fish, cocoanuts, and water are obtainable in small quantities.

**Pandan islands.**—The two islands of Pandan are situated from one to 2 miles northward of Sablayan anchorage ; the southern one is apparently connected with the shore by shallow water. Protection may be obtained, during the south-west monsoon, by anchoring close eastward of the southern island, in 7 to 14 fathoms, mud. In order to reach this anchorage, pass to the northward of, or between the islands.

Lat. 12° 20' N.  
Long. 121° 4' E.

Charts, 940  
[2,669].  
972 [2,660].  
Var. 1° E.

Lat. 13° 11½' N.  
Long. 120° 33½' E.

**The coast**, north of Sablayan anchorage, trends north-north-westward to Talabasi point, and is low and sandy. From this point, which is surrounded by a reef, the coast continues in about the same direction to Mamburao reef.

**Mamburao reef** projects about 3 miles southward from Karanisan point, and has a depth of one fathom over it at low water. Anchorage can be obtained off the mouth of Mamburao river, westward of the reef, in a depth of 4½ fathoms, mud and sand, with shelter from north and east winds.

**Tubile point**, 3½ miles westward of Mamburao river, has two islets off its south side, which with the point are steep-to. The bight between it and Mamburao is encumbered with rocks.

Lat. 13° 22' N.  
Long. 120° 29' E.

**PALUAN BAY** affords good shelter in the north-east monsoon, and is also a convenient place for vessels to obtain supplies when passing through Mindoro strait. The bay is 5 miles wide at its entrance, and free from dangers for 3 miles in a northerly direction. Reefs, dry at low water, extend a quarter of a mile from either point of entrance, having deep water close-to.

The best anchorage is in the north-eastern end of the bay in 14 fathoms (to which depth the water suddenly shoals from 20 fathoms), with the Black rock off the cliffy head on south side of the entrance to the stream, bearing East distant 1½ miles. The bottom consists of a black tenacious mud.

**A reef** projects 4 cables beyond the Black rock, and has depths of 8 to 12 fathoms close to its edge.

**Water** is obtainable from the river. The village of Paluan is charted on the north point of the entrance.

**Caution**.—Care must be taken when working into Paluan bay, for the squalls come violently off the high land, are very sudden, and at night do not give the least warning.

Lat. 13° 25½' N.  
Long. 120° 18' E.

**Cape Kalavite** is the north-west extreme of Mindoro. Between it and Paluan bay the water is deep near the shore; for the few rocks interspersed along the coast lie close in, and one of them, just above the water near the cape, has a sandy beach abreast. Mount Kalavite, within the cape, the summit of which is about 2,000 feet high, and dome-shaped, appears very regular when seen from the westward, and is visible from a considerable distance in clear weather.

**LUBANG ISLANDS** are a detached group of six islands that front the south-west end of Luzon and the north-west end of Mindoro. They are uninhabited with the exception of Lubang island, which has a population of about 3,000. The only safe anchorage for vessels during

all seasons is the port of Tilig, situated on the north-east coast of Lubang Chart, 972 [2,660].  
Var. 1° E. island. See light, page 315.

**Golo island**, a high but narrow island, 8 miles in length, with reefs off its north-east, east, and south-east points, adjoins the south-east extreme of Lubang. No soundings are shown on its south side, but a reef is known to extend one cable or more. H.M.S. *Teazer*, 1872, anchored in 13 fathoms, mud, near this side, with cape Kalavite bearing S.  $\frac{1}{4}$  W., and the eastern extreme of the land S.E. by E.  $\frac{1}{4}$  E. About a quarter of a cable nearer the shore depths of 4 to 5 fathoms, coral, were obtained.

The channel between this island and Lubang is 4 cables wide, with a Lat. 13° 41' N.  
Long. 120° 18' E. rock nearly awash in its centre. The flood stream runs to the south, and the ebb to the north through this channel.

**Lubang island**, 16 miles in length, north-west and south-east, is the largest and most important island of the group; it is high in the middle, but low at each extreme and for several miles within its north end.

Its coasts are fronted by a reef to the distance of about a quarter of a mile; the south-west coast is rocky. On the eastern and north-eastern sides are several bays, affording more or less protected anchorage.

**Luk bay**, on the east side of the south end of Lubang, affords safe Lat. 13° 43' N.  
Long. 120° 17' E. anchorage, being somewhat protected from the north-east winds by Ambil island.

A reef extends 4 cables northward of the south point of entrance and 2 cables south-eastward of the north point, and there is a patch which dries about midway between, with a passage 3 cables wide on either side of it.

Good holding ground will be found in depths of from 10 to 20 fathoms at and a little within its entrance points. Under the former depth it suddenly shoals, and several coral reefs encumber the bay and bar direct access to the inner depths between these barriers, where a short steam-vessel might be moored in excellent shelter.

In approaching the bay from the south-eastward, the 3½-fathoms patch, situated about 3 miles eastward of the southern point of the bay, should be given a berth.

**Supplies.**—At the village of San Rafael at the head of the bay is a stream of good water, accessible when the tide is high. Bullocks, poultry, and vegetables can be obtained.

**Ambil island**, about 4½ miles in length, east and west, has a conical mountain, about 2,500 feet high, with a plain on its western side. The north-east coast is high and rocky, with an open bay, in which are

Var. 1° E.

depths of 10 to 11 fathoms. On the west side is a bay half a mile broad, in which anchorage can be obtained in 4 fathoms, mud; a reef extends 2 cables from the shores of this bay.

The passage between Ambil and Lubang is clear, but caution is necessary on account of the reefs, which contract the channel to one half its apparent breadth. The flood stream sets southward, and the ebb northward, through this channel.

There is apparently sheltered anchorage in the southern part of the channel in depths of about 12 fathoms.

**Ambil bank** has a rock in its centre with  $1\frac{1}{2}$  fathoms water over it, situated about  $1\frac{1}{2}$  miles west of the north extreme of Ambil island; the bank is crescent-shaped, 2 miles in extent with general depths of 4 to 5 fathoms.

**Mandani island**, one mile off the north-east side of Ambil island, is half a mile in extent, with two hills of unequal height. On the south-west side is a shoal at a cable from the shore; the other sides are steep-to.

Lat.  $13^{\circ} 52' N.$   
Long.  $120^{\circ} 21' E.$

**Malavatuau island**, 3 miles north-north-east of Ambil, is 3 cables in extent, and covered with brushwood. It is steep-to and has a passage  $1\frac{1}{2}$  miles broad between it and Mandani island. North-westward of this island are banks on which the least water appears to be  $6\frac{1}{2}$  fathoms, with deep water around.

Lat.  $13^{\circ} 49' N.$   
Long.  $120^{\circ} 11\frac{1}{4}' E.$

**Port Tilig**, on the north-east side of Lubang, is the only safe anchorage for small vessels in all seasons; it is sheltered from all winds and has good holding ground. The entrance faces N.N.W., has depths of  $5\frac{1}{2}$  to 14 fathoms in the fairway, and the reefs on either side mark the channel during rough weather. The western shore can be approached until the anchorage, in front of the bastion, is reached, where there are depths of 4 to 5 fathoms, mud and sand. The head of the bay is occupied by a shoal, dry at low water, dividing the anchorage.

The San Vicente bastion, on the west point of the entrance, is a square stone tower, upon the parapet of which stands a wooden house.

Ingress and egress, unless in very favourable weather, owing to its being on a lee shore, is questionable for a sailing vessel.

Cattle, pigs, and poultry can be obtained at moderate prices, also a fair supply of water.

**Tides.**—It is high water, full and change, in port Tilig, at 9h. 30m.; approximate rise at springs 5 feet.

**Afuera bank**, lying in the approach to port Tilig, is  $1\frac{1}{2}$  miles in length, east and west, by three-quarters of a mile in breadth, with two heads

General chart, 2,577 [2,656].

of  $2\frac{3}{4}$  fathoms, from the outer of which the north point of port Tilig bears Var.  $1^{\circ}$  E. about South, distant 2 miles.

**Cabra island**, the north-westernmost island of the Lubang group, is 2 miles in length, north-west and south-east; it is a flat-topped, wooded island about 200 feet in height, with a reef projecting half a cable from its north-east side. There appears to be no off-lying danger.

The channel between this island and Lubang is about  $1\frac{1}{2}$  miles broad, and may be safely navigated, as the reefs on the north side of Lubang always show. In this channel the flood sets northward and the ebb southward.

**LIGHT.**—From a square red brick tower with a white top, 67 feet in height, erected near the west extreme of Cabra island, is exhibited at an elevation of 217 feet above high water, a *group-flashing white* light with a period of *one minute*, visible between the bearings of N.  $39^{\circ}$  W., through north, east, and south, to S.  $49^{\circ}$  W., from a distance of 22 miles in clear weather. The light shows thus:—Flash, *eight seconds*; eclipse, *seven seconds*; flash, *eight seconds*; eclipse, *thirty-seven seconds*.

Lat.  $13^{\circ} 53\frac{1}{4}'$  N.  
Long.  $120^{\circ} 1\frac{1}{4}'$  E.

**SOUTH-WEST COAST of LUZON.**—Although this coast is out of the ordinary track of vessels passing up and down the China sea, yet it is of importance when proceeding to or from Manila, within the Lubang islands. Vessels navigating along it should keep near the shore, when the tidal stream is adverse.

**Caution.**—The channel between cape Kalavite and the Lubang group, and also that eastward of them, is subject at times between the hours of 4 a.m. and 10 a.m. to heavy off-shore squalls, rendering it necessary for vessels under sail to keep a good look-out, so as to shorten sail in time or to navigate the channels under reduced canvas.

**Cape Santiago**, the south-west extreme of Luzon island, is moderately high, wooded, and surrounded by a reef which dries out to the distance of about a cable from the shore.

**LIGHT.**—From a brick conical tower with white lantern, 51 feet in height, erected on the south-west side of Santiago point, is exhibited at an elevation of 90 feet above high water, a *group-flashing white* light with a period of *thirty-six seconds*, visible seaward between the bearings of S.  $38^{\circ}$  E., through east and north, to West, from a distance of 16 miles in clear weather.

Lat.  $13^{\circ} 46'$  N.  
Long.  $120^{\circ} 39\frac{1}{4}'$  E.

The light shows *three* consecutive flashes of *four seconds* each with eclipses intervening; interval between flashes, *two seconds*, between groups of flashes, *twenty seconds*.

Var. 1° E.

**Telegraph.**—There is a semaphore station on cape Santiago, in connection with Manila by telegraph.

**The coast.**—From cape Santiago, the coast trends in a north-westerly direction for 3 miles to Kalatayan point, thence northward 9 miles to Talin point, and is very low, with sandy shores and mangroves; it is also intersected by several estuaries, and from Kalatayan point to Talin point, is fronted by a reef which extends 2 miles off. Depths of 14 to 17 fathoms will be obtained half a mile from the edge of the reef.

Lat. 13° 58' N.  
Long. 120° 37' E.

**Talin bay**, north of Talin point, is  $3\frac{2}{3}$  miles wide, but open to the north-west, and foul; its shore is composed of rocky cliffs and sandy beaches. Talin point is of moderate height, and surrounded by reef to the distance of a cable; a rocky patch with a depth of 7 fathoms, and possibly less water, is reported to exist about 3 miles S.W. by S. from it.

**Nasugbu bay**, about 5 miles northward of Talin point, is formed by low land with a dark sandy shore, which is steep-to and wooded. About the middle of this bay the river Lian discharges, on the bar of which is a depth of 2 feet at low water. The town of Nasugbu, containing about 7,800 inhabitants, is situated on the north bank of the river. Anchorage, during the north-east monsoon, can be obtained in front of the bar of the river Lian, in a depth of 5 to 7 fathoms, sand.

**A shoal**, two cables in length east and west, with about one foot water near its centre, lies with its outer end 5 cables south-west of Nasugbu point.

Lat. 14° 8' N.  
Long. 120° 28' E.

**Fortune island**, 450 feet high, situated 6 miles south-westward of Fuego point, is about a mile in extent, and steep-to, with some rocks off its south-eastern side.

**Simo banks**, about 14 or 15 miles northward of the Lubang group, consist of two banks with a least-known depth of 8 fathoms on them. The western bank extends 2 miles north and south, and lies with Fortune island bearing E.  $\frac{1}{2}$  S. distant 12 miles. The eastern bank lies 4 miles nearer Fuego point. There are irregular depths of 20 to 100 fathoms near these banks.

**The depths** off this part of Luzon are irregular, varying from 30 to 110 fathoms, and afford but little or no warning when approaching the dangers, close to which are 17 to 60 fathoms; consequently the navigator will have to approach the coast with caution.

**The Coast.**—Fuego point, situated  $5\frac{1}{2}$  miles north-westward of Nasugbu point, is moderately high and rocky, with an islet off its north side. Two other islets, connected by a reef, lie  $1\frac{1}{2}$  miles S.S.E. of the point, with a pinnacle rock, awash at low water, on their eastern side and other rocks near them.

From Fuego point, the coast trends northward about 7 miles to Limbones island, and is intersected by various bays. It is elevated, rocky, and steep-to, with several islets in its vicinity.

**Port Jamelo**, situated about 3 miles northward of Fuego point, in the bay of the same name, is from 4 to 5 cables broad in its entrance, with depths of 14 to 16 fathoms, decreasing gradually towards the shore.

The best anchorage is on the north side in 6 to 7 fathoms. Mangroves grow near the mouth of the river which discharges at the head of the port, the shore of which is low.

**MANILA BAY** is pear-shaped, about 30 miles in length and the same in bread that the upper end; its entrance is about 10 miles in breadth, with Corregidor and Caballo islands situated on the northern side of the main fairway. The depths are about 13 to 14 fathoms, mud and sand, in the centre of the bay and deeper at the entrance, decreasing gradually towards the shore. It affords good anchorage for all classes of vessels; but loading and discharging cargo is interrupted at times by strong winds, especially during the south-west monsoon period. On account of the great extent of the bay, the typhoons at times prove disastrous to shipping; see storm signals, page 325.

The land at the entrance is high and covered with vegetation, while the shores at the head of the bay are low, marshy, and intersected by numerous small rivers, estuaries, and tidal lakes.

**Islands and dangers in Manila bay.**—Corregidor and Caballo are two islands dividing the entrance of Manila bay into two channels, known respectively as Boca Chica, or North channel, and the Boca Grande, or South channel.

**Corregidor**, the larger of the two, 589 feet high, lies near the north shore, and is  $3\frac{1}{2}$  miles long, east and west. On the north side is a small cove where is San José and a military hospital. Corregidor is a signal and telegraph station.

From Buri point, at the east end, a reef extends nearly to Caballo; close to the north-west side are two rocks, one of which is perforated.

**Caballo** is a bluff rocky island 381 feet high and three-quarters of a mile in length, partially covered with verdure, lying about three-quarters of a mile southward of the east end of Corregidor. A patch of reef lies about 6 cables from its west end.

The tidal stream runs strong in the narrow passage between Caballo and Buri point reef.

**North side of entrance.**—**La Monja**, or Haycock, is a small rock, 120 feet high, situated nearly  $2\frac{1}{2}$  miles westward of Corregidor island, with deep water all around it.

Chart, 976 [2,665].

Var. 1 $\frac{1}{2}$  E.  
Plan of port on  
chart.

**Port Mariveles**, on the north-west side of the entrance to Manila bay, is about 1 $\frac{1}{2}$  miles in length, and one mile in breadth, with good anchorage, sheltered from all but S.E. winds. The village, situated on the north-west shore of the bay, consists only of a street parallel to the beach and of two others at right angles to it. There is a telegraph station at Mariveles. Excellent water may be procured here.

Vessels may anchor in 17 fathoms, with the village bearing N.W. by W., or they may run farther into the bay if necessary; the bottom being good holding ground, and the anchorage safe.

Some rocky islets, Los Cochinos, project half a mile off the west point of entrance. Monti the outermost has a rock awash close to its south side, with Guardia shoal of 1 $\frac{1}{4}$  fathoms beyond it, nearly 2 cables southward of the islet, with a depth of 10 fathoms close-to.

**Quarantine station**.—South-west of the village is the quarantine station for Manila. Fronting it is a stone wharf 400 feet in length, with a depth of 25 to 28 feet alongside; there is a good boat-landing place.

There is a red buoy southward of the wharf in a depth of 4 fathoms, and a white buoy one cable south-east of the north end of the wharf.

**Coast**.—From port Mariveles, the coast trends east to Lasisi point, then north-east to Limay point; between these points the shore is fronted by foul ground.

**Shoal**.—A shoal of 2 fathoms, on which the American ship *Sea Witch* is said to have grounded in 1884, is charted with Real point bearing W.S.W., distant about one mile.

**South side of entrance.—Limbones and Karabao islets** are two rocky islets on the south side of the entrance: between them is Patungan cove 2 miles in length. From Limbones islet, the coast is high and cliffy nearly to Marigondon river, which forms the eastern boundary of the high lands of the Sierra de Pico de Loro.

A semaphore station has been established on Kalumpang (Kalung-pang) point, abreast Karabao islet.

Lat. 14° 19' N.  
Long. 120° 37 $\frac{1}{4}$ ' E.

**El Fraile** rock, 70 feet in height, which appears like a sail, lies 3 $\frac{1}{2}$  miles southward of Caballo island, and nearly 2 miles from the south shore of the bay, with depths of 10 fathoms around.

**St. Nicholas banks** lie about midway between Corregidor island and port Kavite, and extend about 5 miles off the southern shore. The outer bank is about a mile in diameter, with a depth of less than 5 feet towards its centre, and is steep-to on its north and west sides. There is a passage about half a mile wide, with a depth of 3 $\frac{1}{2}$  fathoms between the above bank and the inner bank of 1 $\frac{1}{2}$  fathoms. La Monja rock, seen northward of Corregidor island, bearing S. 70° W., clears St. Nicholas banks and beacon.

**Beacon.**—An iron light-tower on masonry base, standing about 36 feet above high water, has been erected in a depth of 20 feet water, on the north-west extreme of the St. Nicholas banks, with Caballo lighthouse, bearing S.W. by W.  $\frac{1}{2}$  W., distant  $9\frac{1}{2}$  miles. The beacon is painted black and red in horizontal bands. *See Lights*, page 320.

Charts, 976 [2,685],

3,487 [3,462],

975 [2,686].

Var.  $1^{\circ}$  E.Lat.  $14^{\circ} 27' N.$ Long.  $120^{\circ} 45' E.$ 

**KAVITE HARBOUR**, about 7 miles south-westward of the city of Manila, is the port and marine arsenal of Manila, where vessels are built and repaired. It is at present the United States naval head-quarters, though a transfer to Súbic bay is under consideration; there are, however, great engineering difficulties at Olongapo, the proposed site. The town of Kavite is fortified, and stands on a low peninsula, the north extreme of which, named Sangley point, is reported to be extending to the eastward. The bay outside of a line drawn from Sangley point to the buoy off the eastern end of the navy-yard has a depth of 3 to 4 fathoms, decreasing gradually southward. Bakor bay, south of the town of Kavite, is shoal.

Vessels can anchor abreast and within Sangley point in a depth of 4 to  $4\frac{1}{2}$  fathoms, mud, well sheltered from south and south-westerly winds.

The mainland at the entrance to the port is high and covered with vegetation, while the shores at the head of the bay are low, marshy, and intersected by numerous small rivers, estuaries, and tidal lakes.

**Wireless telegraph station.**—A wireless telegraph station is established at Kavite, the call letters being U. T. *See page 46.*

Telegraph office at Kavite is always open.

**Port limits.**—The northern boundary of Kavite harbour is an imaginary line half a mile northward of, and parallel to, a line joining Sangley point with Parañaque. The area within this limit is reserved as a naval anchorage, and no vessels other than those under the cognizance of the Navy may enter therein without permission from the senior naval officer afloat. *See also page 13.* All vessels must berth according to the directions of the harbour authorities. A powerful tug is available for the assistance of vessels requiring its use.

No ashes, or other refuse, is to be thrown overboard in the port of Kavite. Lighters to remove such matter will call alongside upon the signal—International letter “L” being hoisted, unless prevented by bad weather.

**Coal.**—At Sangley point, the coaling station for the United States Navy, there is a good wharf, with modern appliances, where 55,000 tons of coal are stored. The frontage to the coal sheds is being dredged to a depth of 20 feet. There is a coaling pier for small craft westward of the wharf.

**Time signal.**—A time ball is dropped from a staff on the water tower at the dockyard, at 11 a.m. mean time of the meridian of long.  $120^{\circ}$  E. (23h. 3m. 52s. local mean time)—equivalent to 15h. 0m. 0s. Greenwich mean time.

Charts 276 [2,665],  
3,487 [3,462],  
975 [2,666].  
Var. 1° E.

**Docking accommodation.**—There is a patent slip in Kanaçao bay, Cavite, 270 feet in length by 36 feet in breadth, with a lifting power of 1,500 tons; there are also workshops and appliances for small repairs. There is a Government slip with a lifting power of 2,500 tons. The dock-yard contains all requisites for repairs of every kind, either for steam or sailing vessels, and has modern and complete appliances.

**Wreck.**—A wreck lies in a depth of about 21 feet water, bearing S. 69° E., distant 3 cables from Sangley point lighthouse; it is marked on the western side by a buoy, painted with red and black horizontal stripes.

Lat. 14° 23 $\frac{1}{4}$ ' N.  
Long. 120° 34 $\frac{1}{4}$ ' E.

**LIGHTS.—Corregidor island.**—On the summit of Corregidor stands a lighthouse (white dwelling) 42 feet high, from which is exhibited, at an elevation of 631 feet above high water a *flashing* light, showing two *white* flashes and a *red* flash *every twenty seconds*, in the following order:—*White* flash, *red* flash; eclipse; *white* flash; eclipse. The light is visible in clear weather from a distance of 30 miles.

**San José.**—At San José, on the northern side of Corregidor island, at a distance of 8 cables, N. 51° E. from the preceding light, a *red fixed* light, elevated 18 feet above high water, is exhibited from a post on a wharf; the light is visible from a distance of 7 miles.

**Caballo islet.**—A *fixed white* light is exhibited from a cylindrical white tower 11 feet in height, on a low spur at the north-east part of Caballo island, at an elevation of 96 feet above high water, visible in clear weather at a distance of about 10 miles, when bearing from N. 28° E., through north and west, to S. 5° W.

**St. Nicholas banks.**—A *fixed white* light is exhibited from an iron tower on a masonry base, painted red, standing about 36 feet above the level of high water, and situated in a depth of 11 feet on the north-western extreme of St. Nicholas banks; the light is visible in clear weather from a distance of 10 miles.

Lat. 14° 30 $\frac{1}{4}$ ' N.  
Long. 120° 54 $\frac{1}{4}$ ' E.

**Kavite.**—A *fixed red* light is exhibited from an iron framework lighthouse on Sangley point at an elevation of 34 feet above high water, visible between the bearings of N. 89° E., through south and west, to N. 31° W., from a distance of 8 miles in clear weather.

**Pasig river.**—A *flashing white* light, showing a short flash every *four seconds*, and elevated 53 feet above high water, is exhibited from a red circular tower on the extremity of the northern mole at the entrance of Pasig river; it is visible in clear weather from a distance of about 10 miles.

Two *fixed white* electric lights, placed horizontally, 3 feet apart, are exhibited from the end of the south mole at the entrance to Pasig river, elevated 16 feet above high water, and visible at the distance of 5 miles. Should the electricity for these lights fail, a *green* light will be shown.

**MANILA HARBOUR.**—A harbour of about 400 acres in extent Charts, 976 [2,665],  
and with a uniform depth of 30 feet at low water, with ample wharf 3,487 [3,452].  
accommodation, and communicating at its north end with Pasig river, Lat. 14° 36' N.  
is being formed by the construction of breakwaters as follows :— Long. 120° 57' E.  
Var. 1° E.

**West Breakwater.**—The west breakwater, running in a S.S.W. direction upwards of a mile from the outer end of the mole on the south side of the entrance to Pasig river, thence bending to about South, is marked near its extremity by an *occulting red* light every ten seconds, thus :—Light, seven seconds; eclipse, three seconds. The light is shown from the top of a small concrete house, at an elevation of 28 feet above high water, and is visible in clear weather from a distance of 7 miles.

**South-west Breakwater.**—The north-western end of the south-west breakwater is marked by a *fixed green* light, and the south-eastern end, as far as completed, by a *fixed red* light, the latter light being moved outwards as the work progresses.

A *fixed green* light, visible from a distance of 3 miles, situated about one-third of a mile S.S.E. from the south mole end, marks the western side of the entrance to the Pasig river from inside the breakwater. These lights are unwatched and cannot be relied on.

**Tides.**—It is high water, full and change, in Manila bay, at 10 h. 40 m.; springs rise about 6 feet. With an easterly wind, the ebb runs out 18 hours together, between Corregidor and the north shore, fairly strong; the flood runs about 6 hours to the eastward, sometimes weak, at other times with considerable strength.

The greatest range of tide occurs generally in June and December and is about 6 feet; the smallest range of tide is about 3½ feet, generally in March and September. See note on chart, also page 31.

**Directions.**—There are practically no dangers for a steam vessel entering Manila bay; the channels on either side of Corregidor and Caballo islands are deep, and the only unmarked dangers are Guardia shoal lying nearly 2 cables southward of Monti islets and the doubtful patch of 2 fathoms off Kabkabe point on the northern shore. Both the La Monja and El Fraile islets are steep-to, but Caballo island should be given a berth of a mile. St. Nicholas banks are guarded by the light-structure, and La Monja in sight, northward of Corregidor island, leads northward of them. At night, a light is shown on St. Nicholas banks, and Corregidor light bearing southward of W.S.W. leads northward of them.

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General chart, 2,577 [2,656].

E 32369.

X

Charts 976 [2,665],  
3,487 [3,452]. Sailing vessels working in or out must be guarded by the lead and the chart. The southern shore of the bay may be safely approached by the lead except in the vicinity of St. Nicholas banks. The northern shore is steeper and a vessel should tack in good time.

When the wind is blowing from the eastward, the current runs out stronger through the North channel than it does through the broader South channel; it is therefore advisable at such times to adopt the latter, there being more room in it to work to windward.

Within three-quarters or half a mile of the eastern part of Corregidor island, there are depths of 22 fathoms; and when it can be rounded, stand over for and work along the north shore, taking care not to stand in too near the coast in the vicinity of Kabkabe point; when past Limay point, the north shore has good anchorage over a sandy bottom. Farther to the northward and eastward this shore becomes more flat, and the depths decrease regularly.

**Anchorage in Manila road.**—The bank fronting the city, with depths of less than 4 fathoms, extends about one mile off, increasing to nearly 2 miles off the northern part of the city; the edge of the 5-fathoms line is distant about  $1\frac{1}{2}$  miles from the extremity of the moles at the entrance of the Pasig river.

The best and most convenient berth is with the cathedral (square tower) about E.N.E., distant from 2 to 3 miles, in the depth of water preferred, from 5 to  $6\frac{1}{2}$  fathoms. During the north-east monsoon vessels anchor close to the mouth of the river, but in the south-west monsoon period strong winds raise a sea here. It is difficult to make out Manila cathedral at a great distance; there is a low cupola over the centre of its nave, and no other turrets.

Merchant vessels above 16 feet draught usually have to discharge part of their cargo outside before entering the river. Loading and discharging in the road is tedious, and is much retarded by the fresh afternoon breezes, when an unpleasant sea prevails. When heavy weather sets in communication with the shore is often interrupted for days at a time. These drawbacks will be obviated as the works connected with the protected anchorage advance, and the heavy attendant expenses will then be avoided.

Fishing stakes encumber the banks fronting the shore to depths of 5 fathoms or more in places.

**Harbour accommodation.—Pasig river.—New Harbour.**—Pasig river divides the city of Manila into two parts; its entrance, confined between two moles, extending westward from its north and south points, has a navigable depth of about 16 feet at mean low water, and of 20 feet in the harbour. The channel, 300 feet in width, is

buoyed, but the depth on the bar is constantly altering, and frequent dredging is necessary. It is proposed to dredge the river, as far as the bridge of Spain, to a depth of 18 feet at mean low water ; this work is now in progress, and 18 feet can now be carried over the bar. When completed vessels of that draught will be able to enter the river and to load or discharge cargo alongside the wharves.

Pasig river is the principal channel of communication with the interior, and is navigable for about 10 miles ; its average breadth is about 350 feet, with depths from 3 to 25 feet.

The tidal stream runs very strong in the river, and exceptionally so on the ebb in the rainy season.

A protected anchorage, where vessels of or under 25 feet draught can find a shelter, lies within a breakwater (now under construction) which already extends upwards of a mile in about a S.S.W. direction from the outer end of the south mole ; this breakwater is being continued in a south direction for about another quarter of a mile. At  $1\frac{1}{2}$  cables S.  $38^{\circ}$  E. from the extremity of the preceding breakwater a detached (south-west) breakwater is being constructed, which will run in a S.  $38^{\circ}$  E. direction for a distance of 5 cables near the edge of the 5-fathoms line. In this inner anchorage an area of about 350 acres is being dredged to a depth of 30 feet at low water ; an 18-feet channel will also be formed to afford connection direct with the Pasig river from this anchorage. Masonry quays will be built for berthing ships alongside, drawing 30 feet water. It is expected that these works will be practically completed during 1906.

**Buoys.**—The western or outer edge of the dredged channel leading into Pasig river is marked with three black buoys, the outermost moored with the lighthouse on the north breakwater bearing N.N.E.  $\frac{1}{2}$  E., distant  $6\frac{1}{2}$  cables ; the inner buoy lies  $1\frac{1}{3}$  cables S.W.  $\frac{5}{8}$  S. from the lighthouse.

Two red buoys mark the eastern side of the channel.

A black buoy marks the submerged end at the southern extremity of the West breakwater. A red buoy is moored about 20 yards north-west of the north end of the S.W. breakwater.

**Tugs.**—Tugs are obtainable for towing vessels into the river.

**Repairs.**—General repairs to steam vessels up to 2,500 tons can be carried out.

**Pilots.**—Pilotage into the river is compulsory, and pilots can be obtained by making the usual signal.

**THE CITY OF MANILA**, situated at the mouth of the Pasig river, on the eastern shore of the bay, and about 25 miles from its entrance, is the capital of Luzon, one of the largest of the Philippine islands, and the seat of the Government of the Philippine islands.

Lat.  $14^{\circ} 36' N.$   
Long.  $120^{\circ} 58' E.$

Charts 976 [2,665], Tramways run in the principal streets, and electric lights have been laid in 3,437 [3,452].  
 Var. 1° E.  
 Lat. 14° 38' N.  
 Long. 120° 58' E. the public squares, chief streets, and business houses. The southern part of the city, surrounded by a wall, and containing the Government offices, citadel, hospitals, &c., is separated from the northern and commercial quarter, named Binondo, by the river Pasig. On the south-east side of Manila bay is the town and arsenal of Kavite. See page 319.

**Trade.**—The principal industries are in the hands of the Chinese, of whom some 50,000 inhabit the town and suburbs of Manila. The chief imports of Manila are rice, flour, wines, cotton goods, ironwork, petroleum, coal, &c., amounting in value to 6,696,217*l.* in 1902. The chief exports are hemp, tobacco, sugar, copra, &c., of the total value in the same year of 4,984,933*l.*

In 1900, the number of vessels that entered Manila was 462 of 673,148 tons, exclusive of the coasting trade, which was entirely under the American flag. Of the above, 295 vessels of 502,627 tons were British; of these, 212 vessels of 323,152 tons traded direct from and to the United Kingdom and British Colonies, and the remainder from and to other countries.

The population of Manila city in 1903 was about 302,000; of Manila province, as estimated by the Philippine Commissioners, 1899, 500,000.

**Quarantine** regulations have hitherto been very strict, often entailing great inconvenience on vessels arriving. The station is at port Mariveles. See page 318.

**Communication.**—There is frequent communication by steam vessel with Hong Kong, whence there is weekly communication with Europe; there is also occasional mail communication with the Caroline and Ladrones islands. See also page 14.

**Railway.—Telegraph.**—There is a railway between Manila and Dagupan in Lingayan gulf, 123 miles, and telegraph communication between the principal places in Luzon. A submarine telegraph cable connects Manila and Hong Kong, and cables also connect Manila with Panay, Negros, Sebu, Leite, Mindanao, Sulu, and all the principal islands. In addition Manila is connected by a trans-Pacific submarine cable with San Francisco, via Guam and Honolulu; and also with the Caroline islands via Guam. Office at Manila always open.

**Climate.**—The year may be divided into three seasons, the first—cold (65°) and dry for the tropics—commences in November; the second—warm but still dry—commences in March, the greatest heat being experienced from April to the end of May (90°–98°); and the third, which is extremely wet, continues from June till the middle of November. During

the rainy season inundations of rivers are frequent, and travelling in the interior almost impossible. During the months of June, July, and August the air of Manila is rendered impure by exhalations from the swampy land around ; and the weather being sultry, with much rain at times, febrile complaints are then likely to appear. Care should be taken to avoid exposure to the sun. There is a good native hospital (attended daily by an English doctor) to which sick merchant seamen are sent.

**Winds.**—The north-east monsoon blows strong out of Manila bay at times, accompanied by a cloud resembling smoke, which is driven out of the bay to the south-west, and forms an arch in that horizon, when the sky is otherwise clear ; but sometimes sea breezes from the south-west blow into the bay in the north-east monsoon after mid-day, increasing in strength as you advance into the bay.

During the strength of the north-east monsoon, although the wind may be fresh at the entrance, it will frequently be moderate within the bay.

At the season of the south-west monsoon, storms, known locally as “collas,” blow from S.W. to West, and are accompanied by violent squalls and much rain ; they often last for several days.

Land winds, during the north-east monsoon, blow from East in the bay, and from S.E. on the south coast north of Fuego point ; they commence about 4 or 5 p.m., fall towards midnight, then set in again from North, changing to N.E. during the day, and East towards the evening. When hard North or S.W. winds are prevalent there are generally no land winds.

Typhoons frequently occur, and are generally most severely felt in the months of September, October, and November. One that occurred on October 21, 1882, drove 12 ships ashore. Notice of their approach is given from the observatory at Manila, which is in telegraphic communication with a station at the north point of Luzon.

Manila is also visited somewhat frequently by earthquakes.

**Storm signals.**—The following storm signals are shown from a signal staff at the Harbour office, in Pasig river, also from another storm signal station about a quarter of a mile north-west of the Harbour office, where they are visible from the roadstead. These warnings are based upon information collected at the observatory at Ermita. During the day the signals are made by means of a drum, cone, ball, and flag ; and at night by *white* and *red* lights.

The night signal lights are hoisted vertically at the Harbour office ; at the other position, they are hoisted horizontally at three separate masts, and should be read from left to right. The day signals are shown vertically.

1. A *drum* indicates a distant storm, in an unknown direction. Should the storm approach the signal will be changed. At night *two white* lights are shown.

Charts 976 [2,665],  
3,487 [3,452].  
Var. 1° E.

2. A *cone, point upwards*, above a *drum*, indicates that a cyclone will pass some distance to the northward, and that strong gales between south and west are probable. At night *one white* light and *one red* light are shown (*white* light uppermost at the Harbour office staff).
3. A *drum*, above a *cone, point downwards*, indicates that a cyclone will pass some distance to the southward, and that strong winds between east and south are probable. At night *two red* lights are shown.
4. A *ball*, above a *cone, point upwards*, indicates a cyclone in a position dangerous to the locality, without being imminent, leaving time for further notice. At night *three white* lights are shown.
5. A *cone, point upwards*, indicates that a cyclone will pass close northward, and that heavy gales from north, through west to south, are probable. At night *one red* light between *two white* lights are shown.
6. A *cone, point downwards*, indicates that a cyclone will pass close southward, and that heavy gales from north, through east to south, are probable. At night *one white* light and *two red* lights are shown (*white* light uppermost at the Harbour office staff).
7. A *ball* indicates the imminent approach of a cyclone. At night *one white* light between *two red* lights are shown.
8. A *flag* (of any colour) above a *ball* indicates a heavy freshet, and that entering or leaving the river is prohibited, and all boat traffic stopped. At night *three red* lights are shown.

On any one of the above-mentioned signals being made, mariners should take every possible precaution to ensure the safety of their vessels.

**The standard time** kept in the Philippine islands is that of the meridian of long. 120° E., or 8 hours fast on mean time at Greenwich.

**Time signal.**—A time signal is in operation at the Meteorological office, a tower with a flat roof, on the sea wall of the fort. The signal is a ball which is hoisted on the top of the staff at five minutes before noon, and dropped at noon, mean time of the meridian of long. 120° E. (0h. 3m. 52s. local mean time)—equivalent to 16h. 0m. 0s. Greenwich mean time. In case of failure the ball will be slowly lowered five minutes after the signal time.

**Observatory.**—This observatory, situated in Ermita, has been established many years, and is under the direction of the Jesuit Fathers.

It is complete with meteorological instruments of every description. There are also a great number of seismological instruments, most of which are self-recording, and there is a magnetic observatory.

The library contains almost every known work on meteorology and astronomy in all European languages. Charts, 931 [2,689], 976 [2,665], 3,437 [3,452]. Var. 1° E.

Telegrams are received daily from all parts of the Far East reporting the weather, and in the typhoon season valuable warnings are sent from this observatory to the coast of China.

**Supplies.—Coal.**—About 200,000 tons of coal are imported annually, from 10,000 to 11,000 being usually kept in stock.

Vessels at present are coaled from lighters, in the road; about 150 tons may be put on board by day and 250 tons, if working day and night. Coaling is occasionally impeded in the south-west monsoon period.

Water can be purchased, and is brought alongside in steam water-tanks. The water is led by pipes from Santatan on the Pasig river to Manila.

Fresh beef, vegetables, bread and other supplies are obtainable. A cold storage company, established in 1900, has improved the quality of victuals considerably. Australian fish and meat, and usually English game, are kept in stock.

**The COAST** from the entrance of Manila bay trends in a west- Lat. 14° 28' N. north-west direction for about 7 miles to Luzon point, and is indented Long. 120° 23' E. with several coves. Guai bay, the largest of these, affords good temporary anchorage during the north-east monsoon, and is frequented by sailing vessels waiting for a fair tide to enter Manila bay; reefs extend from the entrance points.

**Luzon point** is rocky and peaked, of moderate height, and bordered by a reef extending out for  $2\frac{1}{2}$  cables.

From Luzon point the coast trends north and north-westerly about 16 miles, to Mayagao point; between is a deep bight, named Bagak bay, at the head of which is the town of the same name. Anchorage may be had off the town of Bagak, near the mole, in  $5\frac{1}{2}$  to 11 fathoms of water, care being taken to avoid a shoal patch with a least depth of  $2\frac{3}{4}$  fathoms lying nearly one mile W.S.W. of the town. Bagak should be approached only by daylight, and then with caution.

This coast is in general steep-to, and may be approached to one or two miles; but rocks or foul ground extend from some of the points.

**Port Binanga**, situated 3 miles north of Mayagao point, is the first bight southward of the entrance of port Súbic. Small vessels may anchor here in 4 or 5 fathoms, sheltered from all winds except those from the westward. In entering keep rather towards Buiong Munti, the southern point; Binanga point, on the northern side, is foul to the distance of 3 cables south-westward, and there is a shoal with  $2\frac{3}{4}$  fathoms water one-third of a mile in length, at the same distance southward of it.

Chart. 931 [2,669]. Var. 1° E. A bank with less than 3 fathoms fronts the head of the bay to the distance of half a mile.

**PORT SÚBIC or SÚBIG** is 6 miles in length by 5 miles in maximum breadth, and  $2\frac{1}{2}$  miles wide at its entrance, where Grande island divides it into two channels. The eastern entrance has probably not more than  $4\frac{1}{2}$  fathoms in it, and is intricate. The western entrance is one mile wide, with depths of 30 to 34 fathoms.

This port forms two excellent harbours, one on the east side, named Olongapo, and the other at the northern extremity, opposite the town of Súbic; here vessels may find anchorage sheltered from all winds, in a depth of 7 to 10 fathoms, mud.

Lat.  $14^{\circ} 45' N.$   
Long.  $120^{\circ} 11' E.$

**LIGHT.**—A *white flashing* light, *every second*, is shown at an elevation of 190 feet above high water from a white cylindrical tower, 26 feet high, on Sueste point; it is visible in clear weather from a distance of 20 miles from the bearing of N.  $48^{\circ}$  E., through north, to S.  $36^{\circ}$  W.

**Islands and reefs.**—**Grande island**, in the entrance, 167 feet in height, is about half a mile in length and from one to 3 cables in breadth. A reef extends half a mile southward of it, on which is an islet; a small 4-fathoms patch lies S. by E., distant 7 cables from the islet. The channel, about 8 cables wide between Grande island and the eastern shore, is reduced in width to 4 cables by the reefs extending from either shore.

**Mayanga island** lies in the fairway of the bay about  $3\frac{1}{2}$  miles northward of Grande island. It is surrounded by a shoal which extends about 2 cables northward, the same distance eastward, and for  $3\frac{1}{2}$  cables in a S.E. by S. direction. A rock apparently dries on the north end of the shoal; an iron nun buoy, painted black and marked No. 1, is moored off its south-east extreme.

**Pequeña island**, on the east side of approach to the town of Súbic, is a third of a mile in length, and 180 feet in height; it stands on a reef connected with the shore which extends half a mile southward and 3 cables westward from the island.

**Kalaklan point**, at the northern entrance of port Olongapo, is surmounted by a beacon elevated about 11 feet above the highest part of the point. The beacon consists of a wooden frame in the form of a six-pointed star, painted white, with a centre consisting of a star, painted black.

Lat.  $14^{\circ} 49' N.$   
Long.  $120^{\circ} 17' E.$

**Port Olongapo** is about  $1\frac{1}{2}$  miles in length and the same in breadth between Kuby and Kalaklan points, and has general depths of 11 to 18 fathoms. Kuby point has a broad reef extending from it in a N.W. by N. direction to the distance of  $6\frac{1}{2}$  cables. From Pamokan point, about half a mile to the southward, a broad shelf of shoal ground extends

$\frac{1}{2}$  cables in a W. by S. and W.N.W. direction; and at the distance of one mile W.N.W. from this point there is a detached coral patch, half a cable in diameter, upon which the depth is 3 fathoms. Nakaban point, on the south shore of port Olongapo, is foul to the distance of  $2\frac{1}{2}$  cables.

Chart, 931 [2,669].  
Var. 1° E.  
Lat. 14° 48' N.  
Long. 120° 17' E.

A nun buoy, painted red, is moored on the 3-fathoms patch off Pamokan point, from which Caiman beacon bears N.E. by E.  $\frac{7}{8}$  E., distant  $1\frac{1}{4}$  miles. A beacon-buoy, painted red and marked No. 2, is moored on the north-west edge of the reef on the south side of the entrance to port Olongapo, with Kuby point bearing S.E. by S.

**Caiman shoal**, about a cable in extent and steep-to, lies in the fairway of port Olongapo with its centre about dry at low water; it is marked by a white stone beacon, about 20 feet in height.

Carrasco shoal lies about midway between Caiman shoal and the southern shore.

**Inner basin**.—The eastern branch of Kalaklan river discharges in the north-east corner of port Olongapo, and has an estuary half a mile broad. The passage to the inner basin behind the reefs extending from either shore at this part is reduced to about one cable in width, but it has apparently a depth of about 8 fathoms. The edge of each of these reefs is marked by a buoy; that on the starboard hand entering is painted red, and the buoy on the port hand, black.

**Beacons**.—Eastward of Rivera point two beacons have been erected on Magdalan bluff, situated between the north and south mouths of the Biniktigan river. These beacons consist of white triangles with vertical black stripes, and when in line lead between the red and black buoys marking the fairway to the inner basin.

**The Settlement** is on Rivera point, and is built along the shore facing the port. Some years ago there was a depth of 30 feet alongside the sea wall of the Spanish Navy Yard here, but the wall has fallen in at places, and vessels lying alongside should examine their berths, as several stone blocks project out at certain places to a distance of about 10 feet from the edge of the wall, with a depth of only 15 feet over them. It has been under consideration to make Olongapo the future naval headquarters, instead of Kavite, and to construct a large coaling dépôt and docks here; it appears doubtful, however, whether the proposed works will be carried out owing to great engineering difficulties, presumably due to the great depth of mud forming the mangrove swamp near the place.

There is a telegraph station at the Settlement.

A floating dock, 500 feet in length overall, with a lifting power of 16,000 tons, is being built for port Súbic.

**Súbic settlement** lies at the head of port Súbic. The shores of the bay within Pequeña island are generally fronted by reefs to the distance

Lat. 14° 53' N.  
Long. 120° 14' E.

Chart, 931 [2,669]. of 3 to 5 cables, fairly steep to; but between Kaguan and Apalit points, Var. 1° E. Lat. 14° 53' N. Long. 120° 14' E. the shore reef projects southward upwards of 7 cables.

Kabangan point, close westward of the settlement, has a reef extending 5 cables southward of it, but eastward of this tongue the reef approaches the shore, and there is a depth of 4 to 6 fathoms within a cable of the south side of a portion of the town.

**Communication.**—Olongapo is connected with Manila, &c. by telegraph. It is proposed to connect Súbic, or Olongapo, with the railway from Manila to Dagupan.

**Tides.**—It is high water, full and change, at port Súbic, at 9 h. 56 m.; springs rise 4½ feet; *see notes on plan.*

**Permission to enter the Port.**—Foreign men-of-war, and other public vessels, before visiting Súbic bay, are required to procure permission through the Ministers of their respective countries. No foreign vessel is allowed to enter the actual limits of a Navy Yard in any port of the United States without first obtaining leave to do so.

**Directions.**—There is no difficulty in entering port Súbic by the western channel, but the western shore should be kept, passing westward of Mayanga and Pequeña islands if bound to Súbic. Give Pequeña a good berth as the shore reef extends about 3 cables from the island.

If bound to port Olongapo, when within Grande island, keep Kalaklan beacon bearing eastward of N.E. until "Mancha blanca" (a large white conspicuous mass of rock in the face of the bluff near Patol hill) is seen well open clear of Nakaban point, E.S.E. A vessel will then have passed the outer edge of the shoal extending from Kuby point, and can head in eastward, passing northward of Caiman beacon.

The best anchorage is due South of the Navy Yard on Rivera point, with Caiman beacon bearing West, in a depth of 13 fathoms. Vessels discharging freight outside, anchor north-east of Caiman beacon, and close in towards the end of the Navy Yard wall.

When entering the inner basin with the leading marks at Magdalan in line, course may be altered to port when the machine shops on Rivera point are one point abaft the beam, bearing N.W. by N. There is good anchorage anywhere in the inner basin near the Navy Yard.

Lat. 14° 46' N.  
Long. 120° 8' E.

**PORT SILANGUIN**, situated about 5 miles westward of the entrance to port Súbic, is about three-quarters of a mile wide at its entrance, 2 miles in length east and west, having tolerable shelter from all winds, except those from West to S.W. The southern point is formed by a round bare island, 482 feet in height, joined to the south point of the port by a reef of rocks. The depth in the entrance of the port is 30 fathoms, decreasing gradually to 10 fathoms, which depth will be found close to

General chart, 2,577 [2,656].

the shore reefs. The best berth is in from 17 to 20 fathoms, abreast the Chart, 331 [2,639].  
Var. 1° E. beach within the south point.

Sunken rocks extend about a quarter of a mile westward of the north point of the bay situated north-east of the east end of the island, and there is a patch which dries the same distance off the point within.

From a half to  $1\frac{1}{2}$  miles south-west of Silanguin island are the Los Frailes islets, with sunken and other rocks around and between them; beyond the depth of 5 fathoms they are apparently steep-to. Rocks have been reported to extend one to  $1\frac{1}{2}$  miles westward of these islets.

**Water.**—There are streams of fresh water at the head of port Silanguin.

**COAST.**—Between port Súbic and port Silanguin the coast is high and moderately steep-to. From port Silanguin the coast trends northward 8 miles to Kapones point; it is high, rocky, has three small bays fronted by islets, and is backed by mountains which terminate northward in an extensive plain.

**KAPONES POINT AND ISLAND.—Kapones point** Lat.  $14^{\circ} 54' N.$   
Long.  $120^{\circ} 3' E.$  is the most western point of this part of Luzon, and therefore of some importance to vessels proceeding to and from China, and passing near this coast. It is high, bare land, of reddish aspect, having three islands off it.

**Great Kapones**, the largest of these islands, lying  $2\frac{1}{4}$  miles W.N.W. Lat.  $14^{\circ} 55' N.$   
Long.  $120^{\circ} 01' E.$  from Kapones point, is 8 cables in length, with rocks around. It is a conspicuous mark when made from either northward or southward; its eastern part is the highest, and is sighted before the lighthouse on the western end becomes visible. The other two islands lie nearly midway between it and the coast.

**Depths** of 35 to 40 fathoms will be found within a mile of Kapones point. There is a patch of 6 fathoms 2 miles off shore at 3 miles northward of it.

**LIGHT.**—From a square brick lighthouse, 53 feet in height, situated about 328 yards from the west point of Great Kapones, is exhibited at an elevation of 228 feet above high water, a *white flashing* light of *eight seconds* duration every *half minute*, visible between the bearings of N.  $64^{\circ}$  W., through north and east, to S.  $62^{\circ}$  W., from a distance of 22 miles in clear weather.

**The COAST** from Kapones point trends generally about N. by W. for 21 miles to Botolan or Guai point, which forms the northern extreme of the extensive plain of Playa Honda. Baranca Colorado, a flat-topped hill situated on the sandy plain, lies nearly midway between, and on this stretch of coast are the towns of San Antonio, San Narciso, San Felipe, and Kabangan.

Var. 1° E.

**San Narciso** has an open roadstead, with no protection from north to south-west, and lies about 6 miles north of Kapones point. Vessels drawing 12 feet water can approach to 1½ cables from the beach and find good holding ground.

**San Felipe** is 3 miles north of San Narciso and can be recognised by a large house with a white roof, standing back from the sea. Strangers are apt to mistake this place for Kabangan, situated 5 miles northward.

Between Baranca Colorada and Botolan point, shallow water extends in places to the distance of 5 cables, or farther, from the shore.

Lat. 15° 15' N.  
Long. 119° 59' E

**Botolan or Guai point** is surrounded by a reef to the distance of 3 cables. Mount Botolan, 1,847 feet high, formed by two hills, is situated 2 miles within the point. About 17 miles inland is a range of mountains extending north and south; mount Pinalobo, in this range, reaches a height of 6,040 feet. The summit of another range, 7 miles from the shore, attains an elevation of 4,367 feet.

**Shoals.**—At 2½ miles S. by E. of Botolan point, and about one mile off shore, there is a rock; 2½ miles further south and 2 miles from the coast, there is a pinnacle rock with 4½ fathoms over it, and at 9 and 11½ miles S. ½ W. of the same point are two banks, each with 9 fathoms over them.

Four uncharted rocky patches are reported to lie southward and westward of Botolan point on which the least water found was 6 fathoms, but there may be less; to pass outside these patches give the point a berth of not less than 2½ miles.

Lat. 15° 21' N.  
Long. 119° 57' E

**Iba point**, lying 6 miles northward of Botolan point, is fronted by a coral reef which extends out about 1½ miles south-westward, and continues, with a breadth of about half a mile, along shore northward to Palauig point. South-east of Iba point is the town of Iba, situated about 2 miles from the mouth of the river of the same name; it has a population of about 5,000.

The town of Iba is obscured by trees, but there is a large white iron roof which can be seen at a distance of six miles or more from seaward; this forms a conspicuous landmark, and is said to be a better mark than mount Iba, which is frequently obscured by clouds.

**Anchorage.**—There is good anchorage, with off-shore winds, both above and below the 1½-fathoms shoal which fronts the mouth of Iba river, in a depth of 7 to 10 fathoms.

For the anchorage near the town of Iba, the white roof should be steered for on a N.E. bearing until within about three-quarters of a mile from the shore, and 5 miles from Botolan point, when steer N. by E., heading for the southern nipa house on the beach and a white-washed

barrel surmounting a pole; anchorage may be taken on this line, in a depth of  $3\frac{1}{2}$  fathoms, south-eastward of the  $2\frac{3}{4}$ -fathoms reef. The soundings when approaching Iba are very irregular and the bottom is rock and coral.

There is a small boat landing just south of Iba point, from which a fairly good road leads to the town, which is about one mile inland.

**Telegraph.**—Iba is a telegraph station.

**Shoal.**—A shoal, with an estimated depth of  $3\frac{1}{2}$  fathoms, and steep-to, lies about 4 miles from the shore in the approach to Iba, situated with Iba mount bearing N.  $71^{\circ}$  E., distant about  $13\frac{1}{2}$  miles, and High peak N.  $44^{\circ}$  E. (Iba mount is said to be difficult to identify, and is not a good landmark.)

**Palauig reefs** consist of several patches situated from one to  $4\frac{1}{2}$  miles from the coast between Iba and Palauig points; a coral reef fronts the shore between these points. The southern reef, Kinabakbagan,<sup>\*</sup> with  $1\frac{1}{2}$  fathoms water, is  $1\frac{1}{2}$  miles in extent; the northern and largest, with but little water over it, lies  $1\frac{1}{2}$  miles off Palauig point; between these two there are several shallow patches, the outer one having  $2\frac{1}{2}$  fathoms on it. It will be prudent to give these dangers a wide berth.

**Palauig point and bay.**—Palauig point is bordered northward by small islets and rocky shoals, extending  $1\frac{1}{2}$  miles. Between Palauig and Matalvi points is Palauig bay, about half a mile wide, and open to the northwest; the shore is low, sandy, and bordered by reefs; the town of Palauig is situated on its south side. The bay affords good sheltered anchorage at all seasons of the year.

**The COAST** between Palauig point and Caiman point, 30 miles northward, is indented with several bays encumbered with reefs, which project beyond their entrance points.

**PORTS MATALVI AND MASINLOK**, situated between Makalaba island and Bani point, are separated by Pulo San Salvador and the reef which extends eastward of it.

**Pulo San Salvador** is about 100 feet high, thickly wooded, and has reefs extending from a half to three-quarters of a mile off its west and north-west sides. The channel south of the island is about  $3\frac{1}{2}$  cables wide in its narrowest part, has a depth of 15 to 20 fathoms, and leads to port Matalvi.

**Port Matalvi**, between Matalvi island and the coast southward, affords complete shelter; it extends 2 miles east and west, and has a mean breadth of half a mile. The best anchorage is in 8 to 10 fathoms, mud, in the middle of the port. The space south-east of Pulo San Salvador

Chart 945 [2,672].  
Var.  $1^{\circ}$  E.

\*Lat.  $15^{\circ} 22' N.$

Long.  $119^{\circ} 54' E.$

Lat.  $15^{\circ} 30' N.$

Long.  $119^{\circ} 52' E.$

Var. 1° E.

**San Narciso** has an open roadstead, with no protection from north to south-west, and lies about 6 miles north of Kapones point. Vessels drawing 12 feet water can approach to 1½ cables from the beach and find good holding ground.

**San Felipe** is 3 miles north of San Narciso and can be recognised by a large house with a white roof, standing back from the sea. Strangers are apt to mistake this place for Kabangan, situated 5 miles northward.

Between Baranca Colorada and Botolan point, shallow water extends in places to the distance of 5 cables, or farther, from the shore.

Lat. 15° 15' N.  
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**Botolan or Guai point** is surrounded by a reef to the distance of 3 cables. Mount Botolan, 1,847 feet high, formed by two hills, is situated 2 miles within the point. About 17 miles inland is a range of mountains extending north and south; mount Pinalobo, in this range, reaches a height of 6,040 feet. The summit of another range, 7 miles from the shore, attains an elevation of 4,367 feet.

**Shoals.**—At 2½ miles S. by E. of Botolan point, and about one mile off shore, there is a rock; 2½ miles further south and 2 miles from the coast, there is a pinnacle rock with 4½ fathoms over it, and at 9 and 11½ miles S. ½ W. of the same point are two banks, each with 9 fathoms over them.

Four uncharted rocky patches are reported to lie southward and westward of Botolan point on which the least water found was 6 fathoms, but there may be less; to pass outside these patches give the point a berth of not less than 2½ miles.

Lat. 15° 21' N.  
Long. 119° 57' E.

**Iba point**, lying 6 miles northward of Botolan point, is fronted by a coral reef which extends out about 1½ miles south-westward, and continues, with a breadth of about half a mile, along shore northward to Palauig point. South-east of Iba point is the town of Iba, situated about 2 miles from the mouth of the river of the same name; it has a population of about 5,000.

The town of Iba is obscured by trees, but there is a large white iron roof which can be seen at a distance of six miles or more from seaward; this forms a conspicuous landmark, and is said to be a better mark than mount Iba, which is frequently obscured by clouds.

**Anchorage.**—There is good anchorage, with off-shore winds, both above and below the 1½-fathoms shoal which fronts the mouth of Iba river, in a depth of 7 to 10 fathoms.

For the anchorage near the town of Iba, the white roof should be steered for on a N.E. bearing until within about three-quarters of a mile from the shore, and 5 miles from Botolan point, when steer N. by E., heading for the southern nipa house on the beach and a white-washed

barrel surmounting a pole; anchorage may be taken on this line, in a depth of  $3\frac{1}{2}$  fathoms, south-eastward of the  $2\frac{3}{4}$ -fathoms reef. The soundings when approaching Iba are very irregular and the bottom is rock and coral.

There is a small boat landing just south of Iba point, from which a fairly good road leads to the town, which is about one mile inland.

#### Telegraph.—Iba is a telegraph station.

**Shoal.**—A shoal, with an estimated depth of  $3\frac{1}{2}$  fathoms, and steep-to, lies about 4 miles from the shore in the approach to Iba, situated with Iba mount bearing N.  $71^{\circ}$  E., distant about  $13\frac{1}{2}$  miles, and High peak N.  $44^{\circ}$  E. (Iba mount is said to be difficult to identify, and is not a good landmark.)

**Palauig reefs** consist of several patches situated from one to  $4\frac{1}{2}$  miles from the coast between Iba and Palauig points; a coral reef fronts the shore between these points. The southern reef, Kinabukbagan,<sup>\*</sup> with  $1\frac{1}{2}$  fathoms water, is  $1\frac{1}{2}$  miles in extent; the northern and largest, with but little water over it, lies  $1\frac{1}{2}$  miles off Palauig point; between these two there are several shallow patches, the outer one having  $2\frac{1}{2}$  fathoms on it. It will be prudent to give these dangers a wide berth.

**Palauig point and bay.**—Palauig point is bordered northward by small islets and rocky shoals, extending  $1\frac{1}{2}$  miles. Between Palauig and Matalvi points is Palauig bay, about half a mile wide, and open to the northwest; the shore is low, sandy, and bordered by reefs; the town of Palauig is situated on its south side. The bay affords good sheltered anchorage at all seasons of the year.

**The COAST** between Palauig point and Caiman point, 30 miles northward, is indented with several bays encumbered with reefs, which project beyond their entrance points.

**PORTS MATALVI AND MASINLOK**, situated between Makalaba island and Bani point, are separated by Pulo San Salvador and the reef which extends eastward of it.

**Pulo San Salvador** is about 100 feet high, thickly wooded, and has reefs extending from a half to three-quarters of a mile off its west and north-west sides. The channel south of the island is about  $3\frac{1}{2}$  cables wide in its narrowest part, has a depth of 15 to 20 fathoms, and leads to port Matalvi.

**Port Matalvi**, between Matalvi island and the coast southward, affords complete shelter; it extends 2 miles east and west, and has a mean breadth of half a mile. The best anchorage is in 8 to 10 fathoms, mud, in the middle of the port. The space south-east of Pulo San Salvador

Chart 345 [2,672].  
Var. 1° E.

\*Lat.  $15^{\circ} 22'$  N.  
Long.  $119^{\circ} 54'$  E.

Lat.  $15^{\circ} 30\frac{1}{2}'$  N.  
Long.  $119^{\circ} 52\frac{1}{2}'$  E.

Chart 945 [2,672]. is foul and strewn with rocks, but anchorage can be obtained in a bay on Var. 1° E. the east side of the island, in 5 to 6 fathoms, protected from northerly winds. Water can be obtained from a spring near Matalvi point, on the southern shore.

Makalaba island, at the entrance of the channel leading to port Matalvi, is circular in form, with a sandy beach on its east side; reefs extend about three-quarters of a mile from its north and south points. The island is connected by a sunken reef, with the reef forming the west side of entrance to the port. The reef eastward of Makalaba island, which extends half a mile in a N.N.E. direction from Luan point is marked at its extremity by a conical buoy, painted red.

**Beacon.**—On the south-eastern end of Lagat island, lying off the north-east point of Matalvi island, there is a diamond-shaped beacon 32 feet in height, painted white with a black vertical stripe.

**Directions.**—To enter port Matalvi, steer in with the beacon on Lagat island, bearing S. 60° E., and when the west extreme of Matalvi island bears S. 12° E., alter course to S. 1° E. and pass about 1½ cables from the west side of that island; continue around the island, keeping in mid-channel, and anchor about half a mile from the south-west point of Matalvi, in a depth of 8 fathoms.

Lat. 15° 33' N.  
Long. 119° 56' E.

**Port Masinlok.**—The channel between Pulo San Salvador and the reef extending nearly a mile southward of Bani point is 1½ miles wide, but it is encumbered by many isolated shallow patches which reduce the navigable channel between them and the island to a breadth of 4 cables, in which there are depths apparently of 14 to 20 fathoms. There is a circular reef between them about a mile in diameter, and the shore is fronted by a reef, steep-to, to the distance of about half a mile.

The south-eastern part of port Masinlok is greatly obstructed by a bank of sand and coral in the shape of a tongue, which projects from off the village of Masinlok in a W.S.W. direction for a distance of 1½ miles; the extremity lies about 4 cables North of the east point of Pulo San Salvador. The bank is about 3½ cables in width, and upon it the depths are 3 fathoms, decreasing to half a fathom in the middle part of the tongue.

The village of Masinlok has about 6,300 inhabitants; the church, a large stone building, is conspicuous from seaward. The principal trade is nipa and firewood.

**Directions.**—To enter Masinlok, steer in with the north-east end of San Salvador island bearing S. 57° E., until the west side of that island bears S. 23° E.; from this position a S. 46° E. course, heading eastward of the middle of Salvador, should take the vessel about midway between the reefs on either side of the channel, giving them a berth of nearly 2 cables.

When about 2 cables from the reef extending out from the middle part of the northern shore of San Salvador island, alter course to N.  $67^{\circ}$  E., which will lead up to the anchorage. Chart. 945 [2,672].  
Var.  $1^{\circ}$  E.

The anchorage is northward of the projecting sand and coral tongue, in a depth of 11 fathoms, mud, with the centre of the village bearing E. by S.  $\frac{1}{2}$  S., distant three-quarters of a mile; it is open to the north-west.

**Oyon bay**, the northern arm of the port, apparently affords sheltered anchorage in about 8 fathoms, mud, being protected by the large circular reef in its entrance; this reef has a passage on either side of it about 2 cables wide, with depths of 4 to 8 fathoms. It would be difficult of access unless the reefs are easily seen.

The COAST from Bani point,\* which is low, sandy, and with patches of mangroves, to Santa Cruz point, also low and covered by mangroves, a distance of 11 miles, is fronted by reefs extended 5 miles off. At 4 miles to the north of Bani is Arenas point, of dark coloured sand; between this point and Santa Cruz point is a bay into which three rivers discharge.

**Sabalay bank**, 3 miles in length north and south, and 2 miles in breadth, lies  $1\frac{1}{2}$  miles north-westward of Arenas point; it has a rock awash\* at its eastern edge, with general depths of  $1\frac{1}{2}$  to 5 fathoms, over a rocky bottom. Between Sabalay bank and Arenas point are several pinnacles with depths of  $2\frac{1}{2}$  to 4 fathoms. Lat.  $15^{\circ} 35' N.$   
Long.  $119^{\circ} 54' E.$

**Tortuga bank**, about 3 miles southward of the rock awash on Sabalay bank, is 2 miles in extent east and west, with a least depth of  $2\frac{3}{4}$  fathoms. Lat.  $15^{\circ} 40' N.$   
Long.  $119^{\circ} 51' E.$

**DASOL BAY** lies between Santa Cruz and Caiman points, within a chain of islands and reefs; there are several shoals situated from one to 2 miles off the main shore. The bottom generally is rocky and shoals in a dangerously irregular way. The bay should only be entered by daylight, and then with extreme caution.

**Hermana islands**, or the Sisters, 3 miles apart, fronting Dasol bay, are wooded, with conspicuous sandy beaches; Hermana Mayor is 130 feet high. Hermana Menor, or Makalira, the southernmost, lies off Santa Cruz point, the channel between having  $3\frac{1}{2}$  fathoms water in it. The island, smaller and lower than Hermana Mayor, is about one mile in diameter, encircled by a reef, and there is a depth of  $4\frac{1}{2}$  fathoms about  $1\frac{1}{2}$  miles south-west of its south point.

Hermana Mayor has a narrow ringing reef; a bank with a depth of  $3\frac{1}{2}$  fathoms extends  $1\frac{1}{2}$  miles south-westward from its south end, southward of which in the centre of the passage between the two islands, there is a shoal with a depth of  $4\frac{1}{2}$  fathoms. North of the island lies a reef about 3 miles in length N.W.  $\frac{1}{2}$  W. and S.E.  $\frac{1}{2}$  E., with rocks above water;

Var. 1° E.

between it and Hermana Mayor there is a channel with a depth of  $2\frac{1}{2}$  fathoms. Between the above reef and Adder or Culebra island there is apparently a channel with 11 fathoms water.

Lat.  $15^{\circ} 48' N.$   
Long.  $119^{\circ} 47' E.$ 

**LIGHT.**—From a conspicuous white framework tower, 34 feet high, erected on the summit, near the centre of Hermana Mayor island, a *white fixed* light is exhibited, elevated 162 feet above high water, and visible in clear weather from a distance of 10 miles. The light is obscured by trees over a small arc in the channel south of the island.

**Adder or Culebra island**, about 5 miles northward of Hermana Mayor, and  $1\frac{1}{2}$  miles south of Caiman point, is small, has trees on it and a sandy beach. It is encircled by a reef which extends some distance northward, and for about half a mile or more from its southern side.

Reefs lie about 2 miles north-east and south-east of Adder island, for which see the chart.

Caiman point has a reef projecting southward a short distance.

Lat.  $15^{\circ} 48' N.$   
Long.  $119^{\circ} 42' E.$ 

**Santa Cruz**, at the southern end of Dasol bay, is a telegraph station. The port is used by coasters, who, if coming from the northward, enter by the passage between Caiman point and Culebra as if bound for Tambove road, thence between Hermana Mayor and Raton islet. If from the westward, and using the channel between the two Hermanas, which, although wide is reported to be dangerous, edge toward the southern island and steer for a prominent white scar on a low range of thickly wooded hills, 3 miles inland, bearing E.  $\frac{3}{4}$  S., which will lead between a black buoy on the port hand and a red buoy on the starboard. Good anchorage may be found on this course when Santa Cruz point bears S.W. by S. in 11 fathoms, mud; small vessels can anchor in 4 fathoms, half a mile from the beach.

**Raton islet** stands on the reef situated about a mile off the point near the mouth of Nayun river, northward of Santa Cruz; and there is a reef about one mile northward of it.

Lat.  $15^{\circ} 57' N.$   
Long.  $119^{\circ} 49\frac{1}{4}' E.$ 

**Tambove road**, the north-east end of Dasol bay, is only open to southerly winds, and has anchorage in depths of from 6 to 13 fathoms. Wood and good water may be obtained here. At the head of the bay is Dauli point, 2 miles southward of which, and about a mile off-shore, there is a bank with 6 feet water over it. Both shores are foul, and neither should be approached within the distance of a mile. A reef is charted as lying about  $1\frac{1}{2}$  miles off Tangiao river.

**Anchorage.**—Good anchorage, well sheltered from all except southerly and south-west winds, may be had in the first bay eastward of Caiman point. There is a bank with a least known depth of 5 fathoms between Caiman point and the next point eastward. After crossing this bank the water deepens and then shoals gradually to the head of the bay.

**Directions.**—The best approach to Tambove road is between Adder island and Caiman point reefs, which passage is deep and one mile wide, and presents no difficulty. Vessels should keep north of mid-channel as the reef extends further from Adder island than from the point. When within Caiman point steer to give a berth to the reef extending off the next point eastward which is said to be charted too far to the southward with reference to Caiman point and Adder island; when the road or bay is well open steer to the northward for Dauli point, but until in soft mud it will be inadvisable to anchor, for rocks are scattered over the bottom where it consists of sand.

**THE COAST** from Caiman point\* to Piedra point, 25 miles to \*Lat.  $15^{\circ} 54' N.$  Long.  $119^{\circ} 45' E.$  the northward, is level and of moderate height and sterile aspect, with a steep beach fronting the sea; it may be seen from a distance of about 24 miles. At a mile distant the depths are about 50 fathoms, but near the coast sunken rocks exist in places. Tambobo point,  $6\frac{1}{2}$  miles northward of Caiman point, is bordered by rocks and the point 4 miles further northward is said to be foul for a considerable distance and should be given a berth of about 3 miles. Agno-Grande, a circular bay southward of Arena point, affords shelter for small craft from north-east winds, off the mouth of the river in 6 to 8 fathoms, with the north point of the bay bearing N.W. As this coast has not been surveyed it is advisable to give it a wide berth.

**CAPE BOLINAO** is the northern end of the peninsula which forms the western shore of Lingayen gulf. It is of moderate height, thickly wooded, slopes gently to the sea, and may be seen in clear weather at the distance of about 24 miles.

**Piedra point**, the north-west extreme of the peninsula, is moderately high, steep-to, and sterile in appearance. From Piedra point, the coast fringed with shoals and reefs, trends north-eastward for 7 miles to cape Balingasag, near which stands the town of Bolinao. There is a semaphore on Piedra point connected with the telegraph system of Luzon.

**LIGHT.**—From a white framework structure, 75 feet in height, on Piedra point, at an elevation of 277 feet above high water, an *occulting white* light is exhibited every *ten seconds*, showing thus:—Light, *seven seconds*; eclipse, *three seconds*; visible in clear weather from a distance of 12 miles.

**PORT BOLINAO** is the indentation in the coast at the north-east extreme of Cape Bolinao, its eastern and southern sides being formed and protected by Santiago island and other islands south of it. The port is about 3 cables in width with a general depth of 6 to 10 fathoms, mud, and though open to northerly winds in the outer part, affords good shelter

General chart, 2,454 [2,670].

Chart. 3,392  
[2,420].  
Var.  $0\frac{1}{2}$ ° E.

within Binabalian point. This is considered to be one of the best typhoon shelters in northern Luzon.

The entrance to port Bolinao is about 3 cables wide between the 5-fathoms lines, with coral reefs on both sides, and should be approached with caution; generally the edges of the reefs are defined by breakers. A patch of 2 fathoms lies  $4\frac{1}{2}$  cables N.  $\frac{1}{4}$  E. from Trinchera point.

Lat.  $18^{\circ} 23\frac{1}{4}'$  N.  
Long.  $119^{\circ} 53\frac{1}{4}'$  E.

**LIGHT.**—On the southern shore of the entrance to port Bolinao, from the trunk of a tree, 27 feet high, painted white and surmounted by a starshaped top-mark, a *red fixed* light is exhibited, elevated 62 feet above high water, and visible in clear weather from a distance of 7 miles. The light bearing S.  $30^{\circ}$  E. leads between the reefs in the entrance.

**Buoys.**—The west side of the passage into port Bolinao is marked by a nun buoy painted red, moored 6 cables N.  $\frac{3}{4}$  W. from Trinchera point. The edge of the shoal off Santiago island is marked by a can buoy, painted black, placed  $5\frac{1}{2}$  cables N.E.  $\frac{3}{8}$  N. from the same point.

**Anchorage.**—Vessels with cargo can anchor in the channel abreast the stone building on the beach, in 9 fathoms, mud; this position, however, is exposed to northerly winds. The anchorage south-east and east of Binabalian point affords perfect protection from all directions.

Fresh water may be obtained from a large spring on the south shore opposite Binabalian point.

**Telegraph.**—There is a telegraph station at Bolinao town.

**Directions.**—In strong northerly winds there is an area of heavy seas about 6 miles N.W. by N. of the entrance to port Bolinao, which area has not been investigated. This may be avoided by approaching the port on a South course, passing 2 miles west of Silakwi island.

To enter, bring the bluff on Binabalian point, a rocky cliff 87 feet high cleared of trees and whitewashed, to bear S.S.E.  $\frac{1}{2}$  E. when at a distance of at least 3 miles, and steer for it; this will lead through the centre of the channel between the reefs, in a depth of 9 fathoms. When within half a mile of Binabalian point keep a mid-channel course to an anchorage, being very careful in rounding that point from which shoal ground extends nearly  $1\frac{1}{2}$  cables, and avoiding the bay opposite, also shoal for nearly one cable; elsewhere to the anchorage the shores are abrupt.

A passage to Lingayen gulf leads southward from the anchorage. There is reported to be a channel through with about 8 feet at high water; this is sometimes used by small steamers, but is said to be unsafe without a pilot.

**Off-lying islands.**—**Santiago island** lies off the north-eastern part of cape Bolinao, and forms the northern side of Bolinao harbour. It is about 4 miles in length, north-west and south-east, and

2 miles in breadth. Santiago, covered with trees, is moderately high, and terminates in a bluff at its north extreme; its highest portion is visible at <sup>Chart, 3,392  
[2,620].</sup> Var. 0° E. the distance of about 18 miles.

**A Coral reef** extends northward and eastward from Santiago for a distance of  $2\frac{1}{2}$  miles.

**Silakwi islet**, 70 feet high, standing upon the coral reef of Santiago island and situated about 3 miles north-north-east of the entrance to port Bolinao, appears wedge-shaped when seen from the westward; between it and Santiago island are several rocky islets. The reefs to the northward and westward of Silakwi island are steep-to and plainly visible except in very calm weather.

Lat. 16° 28' N.  
Long. 120° 5' E.

**Shoals.**—A shoal with 8 fathoms lies 4 miles N.E. of Silakwi islet, and another with 7 fathoms lies  $6\frac{1}{2}$  miles N.E. by E.  $\frac{1}{4}$  E. of the islet. There is also a shoal, about 4 miles in extent in a north and south direction, the depths on which vary from  $5\frac{1}{2}$  to 20 fathoms, situated with its southern part N.N.E.  $\frac{1}{4}$  E. from Silakwi islet, distant about 4 miles.

(Vessels are recommended on rounding Silakwi island to give it a berth of at least 8 miles.) Sailing vessels should especially give these islands a good berth in the north-east monsoon, to guard against any southerly drift that may be prevailing.

**LINGAYEN GULF** is about 30 miles in length, and about 20 miles in breadth at the entrance, between Santiago island and San Fernando point; on the east coast are the lofty mountains of Ilocas, with the mount of St. Thomas, 7,418 feet high. About 3 miles southward of Fernando point there is a prominent brown bluff. The white roof of Bauang church shows clearly, otherwise the villages along the eastern shore are not conspicuous. A series of sharply serrated peaks running from Rabon river to Toko form a conspicuous landmark.

The west coast of the gulf is of moderate height and tolerably level, gradually rising southward to a compact mountain mass. From the island of Santiago, for 12 miles south-eastward the west shore of the gulf is fringed by an almost continuous chain of islands, which are, as a rule, low and wooded, with shallow channels between them available for coasters.

**Winds.**—The prevailing wind during the greater part of the year is from S.E. During the north-east monsoon, land and sea breezes become regular, and blow freshly, with clear atmosphere, but are interrupted by strong north and north-easterly gales; a bank of cloud seen in the north, with a clear sky and high barometer, is a certain sign of the commencement of a gale. In June, the wind blows from S.E. in the morning, with squalls off mounts St. Thomas and San Isidro; towards the evening, it dies away with heavy rain and thunder, and clearing towards midnight, leaves a

Chart. 5,283  
[2,673].  
Var.  $0^{\circ} 4' E.$

light wind from the South, which sets in from the S.E. with the dawn. From July to October there are usually gales from the S.W. and West, lasting for several days, accompanied by torrents of rain.

The worst period in the gulf is from the middle of September until the end of October, when typhoons occur.

**Kabarruyan island**, the south-easternmost of the large islands on the west side of the gulf, is 6 miles in length north and south, moderately high, and covered with trees. These islands are fronted by reefs to the distance of about  $2\frac{1}{2}$  miles.

From Kabarruyan the coast trends south-eastward to Port Sual, is intersected by bays with sandy shores, and has many islets off it.

**The Hundred isles**, or Kapulupulan islands, form a portion of the above-mentioned islets; good protected anchorage can be had westward of this group. Komas and Kabalitian islands lie near the shore between the Hundred isles and Sual, the former being connected with the shore by a reef dry in places. Kabalitian, 345 feet high, is wooded, one mile in diameter, and fringed with rocks.

Lat.  $16^{\circ} 4\frac{1}{2}' N.$   
Long.  $120^{\circ} 6\frac{1}{4}' E.$

**PORT SUAL**, situated at the south-west head of the gulf, has good anchorage, with muddy bottom, at its entrance.

The port is a little over a mile in length north and south, and 7 cables in breadth, with depths of 4 to 7 fathoms; the entrance, however, is narrowed by rocks and reefs which extend 2 cables from Portuguese and Mangas points on either side, to a breadth of about  $2\frac{1}{2}$  cables, while a coral bank, with from one to 3 fathoms water, extends half a mile from the west shore filling up a large portion of the port. There are reported to be several rocky heads in the northern part of the harbour. The shallow water off Portuguese point breaks only with strong easterly winds, but the rocks off Mangas point are always visible.

A white iron tower, 20 feet high, elevated about 80 feet above high water, from which a light was formerly exhibited, stands on the seaward face of Portuguese point, at the entrance to port Sual.

**Adele rock** or bank, about half a cable in extent with  $1\frac{1}{4}$  fathoms least water, and steep-to, lies in the approach to port Sual, with Portuguese point light-tower bearing N.N.W.  $\frac{1}{2}$  W., distant  $6\frac{1}{2}$  cables. A small rock, marked E.D., is charted in a position 2 cables eastward of Adele rock.

**Settlement.**—In the south-west part of the port is the village of Sual, which has a church and a landing jetty. The population in 1880 numbered 3,000.

**Supplies.**—Coal, which is brought from Lingayen to Sual, water, and small supplies of provisions are obtainable.

A British vice-consul resides at Sual. There is frequent communication with Manila by steam vessels, and by railway from Dagupan. Chart. 3,283 [2,675]. Var. 04° E.

**Tides.**—It is high water, full and change, at port Sual, at about 8 h.; springs rise 6 feet.

**Directions.**—Approaching port Sual from the northward, give the islands on the west side of the gulf a berth of 3 or 4 miles. Mount Isidro is a good mark for identifying the port, and so is also the white light-structure on Portuguese point on a near approach. Pass about a cable north of the dry reef off Maugas point with the church bearing W.  $\frac{1}{4}$  S., which mark will lead clear to the anchorage in 4 $\frac{1}{2}$  to 5 fathoms, at the distance of about 6 cables from the church. The bottom of the anchorage consists of hard to soft coral. Owing to the wind blowing in flaws, vessels are very liable to foul their anchors.

**RIO AGNO.—The Coast.**—The land forming the head of Lingayen gulf, eastward of port Sual, is very low, with several rivers discharging through it. Rio Agno, 3 miles eastward of port Sual, has 6 feet on its bar at high water springs, and there is anchorage in a depth of 4 to 5 fathoms, sand, off it. Three perches mark the western side of the entrance channel, but they are not to be depended on. Small craft can ascend the river about 2 miles.

**The town** of San Isidro, with 2,700 inhabitants, is situated on the west bank of this river. Mount Isidro, a conical mountain covered with trees and 2,587 feet in height, lies south-west of the town.

**Dagupan or Binmalei river,** 10 miles east of San Isidro, is another arm of the river Agno; the bar at its mouth shifts frequently, but 6 feet water can generally be carried over it. There is no difficulty after the bar is passed, but the west bank should be kept, and a sunken wreck must be avoided when going alongside the wharf at Dagupan, situated a short distance within the mouth.

Pilots can be obtained by signal whistle from the village at the entrance. The pilots keep the bar channel buoyed out, shifting the buoys as may be necessary. The buoys are bamboo poles with a feathery palm leaf at their head, and should be left close on the starboard hand in entering the river.

**LIGHT.**—A *fixed red* light, elevated 29 feet above high water, is exhibited from a white iron support above a shed on the north-east side of Dagupan river entrance, visible in clear weather from a distance of 5 miles. Lat. 16° 43' N. Long. 120° 19' E.

**Anchorage** can be obtained off Dagupan river in a depth of 6 fathoms, sand, with Dagupan lighthouse bearing S.E. and Lingayen church S.W.  $\frac{1}{4}$  W.

Chart, 8,814  
[2,676]  
Var. 0° E.

**Telegraph.—Railway.**—There is a railway from Dagupan to Manila, and telegraph communications (office always open) with the principal towns of Luzon.

Lat. 16° 2' N.  
Long. 120° 14' E.

**LINGAYEN,** the chief town of the province of Pangasinan, is situated on the island in the delta of the Rio Agro between its western mouth and the Dagupan mouth, small craft reaching it by the latter. The tower of the church of Lingayen is visible for many miles and forms a good landmark. The population of the town is about 20,000; of the province, 304,000.

**Climate.—Products.**—The climate is humid, although healthy for the natives, and the sea breeze blows over the town. The land is low, fertile, and produces rice, maize, indigo, cotton, and nipa wine. Horses, cattle, and buffalo, are raised. Fish, fruit, and vegetables are procurable; water is obtained from the wells as the river is brackish. Small craft are built here.

**The COAST.**—About 2 miles north-eastward of Dagupan light is the entrance to Binlok river, and 4 miles beyond the town of St. Fabian, northward of the mouth of another stream. The coast northward is high and mountainous as far as St. Thomas.

Lat. 16° 16 $\frac{1}{4}$ ' N.  
Long. 120° 23' E.

**Port St. Thomas** lies within a shoal with depths of  $1\frac{1}{2}$  to  $2\frac{1}{2}$  fathoms which extends about  $4\frac{1}{2}$  miles southward of the point forming the west side. If intending to proceed to this port, St. Thomas mount (7,418 feet high) should be brought to bear N.E., or northward of that bearing to pass southward of the shoal; steer for the mount as stated, until the depths decrease to 6 and 7 fathoms, then haul northward for the anchorage.

Northward of port St. Thomas the eastern shore of Lingayen gulf is high and steep-to.

**A reef**, which breaks, extends from the coast about 2 miles to the southward of San Fernando peninsula.

**Research reef**, a detached coral shoal of  $2\frac{1}{2}$  fathoms, about one-third of a mile in extent and lying one mile off-shore, is situated with San Fernando peninsula light bearing N.  $\frac{1}{2}$ ° W., distant 2 miles.

Lat. 16° 37' N.  
Long. 120° 17' E.

**PORT SAN FERNANDO.**—San Fernando point is the north-west extreme of a peninsula about  $1\frac{1}{2}$  miles in length connected with the mainland by a low, narrow isthmus: the peninsula rises gradually to the height of about 100 feet on its north-west side, where it terminates in conspicuous white cliffs which make a good landmark. This peninsula forms with the adjacent coast, two anchorages; in the southern, there is a depth of 5 to 6 fathoms, coral sand and rocky bottom; the northern is the port of San Fernando, where anchorage can be obtained in 5 to 9 fathoms, fine sand, but it is exposed to winds from the northward.

During these winds the southern anchorage affords shelter, but the holding ground is doubtful. Chart. 3,314  
[2,676].  
Var. 04° E.

The north and east sides of the peninsula are fringed by reef to the distance of 4 cables with depths of less than 3 fathoms at three-quarters of a mile north-east of its northern extreme; the south point of the peninsula is foul to the distance of a quarter of a mile. Lat. 16° 37' N.  
Long. 120° 17' E.

**Buoys.**—A conical buoy, painted red, moored in a depth of 4 fathoms, marks the end of the shoal water extending north-eastward from San Fernando point, and lies with the lighthouse bearing S.W.  $\frac{3}{4}$  S., distant about  $1\frac{1}{2}$  miles.

A can buoy, painted black, marks the edge of the shoals on the port hand entering, situated N.E.  $\frac{1}{2}$  N., about  $1\frac{1}{2}$  miles from the lighthouse.

**The town** of San Fernando is situated on the eastern shore of the port, on high land, and is a place of considerable importance, being a regular port of call for the coasting steamers; there is a boat-landing here, but no wharves. San Fernando is a telegraph station.

**Supplies.**—Game and fish are procurable. Water is obtained from wells.

**Storm signals** are shown, day or night, when occasion requires, at San Fernando, from a mast 80 feet high situated eastward of the leading beacons. These signals can be seen with glasses from outside the harbour.

**LIGHTS.**—From an iron tower 27 feet high, at an elevation of 107 feet above high water, a *flashing* light is exhibited showing a *red* flash and a *white* flash *alternately every five seconds*, visible in clear weather from a distance of 16 miles. The lighthouse and keeper's dwelling, both painted white, are conspicuously situated on the bluff on the western side of the peninsula about 6 cables from its northern extreme and near its highest part; the light is visible all around except close inshore near the neck of the peninsula.

At San Fernando town *two fixed red* lights, elevated 25 feet and 112 feet, respectively, above high water, and 500 yards apart, are exhibited from white poles, which in line bearing S.  $36^{\circ}$  E. lead into the bay.

**Beacons.**—The white poles upon which the leading lights are exhibited, are surmounted with top-marks in the form of elongated diamonds, painted white with black vertical stripes through the middle part, rendering them conspicuous as day-marks.

**Directions.**—Entering the port round San Fernando point at the distance of about a mile, steering E. by S.  $\frac{1}{2}$  S. towards the tobacco warehouse at the village of Carlatan until the leading marks are in one, bearing S.  $36^{\circ}$  E., when proceed on that line. When San Fernando point bears S.W. by W.  $\frac{1}{2}$  W., steer about S.S.E., which will lead to good anchorage, in a depth of 9 fathoms, about 4 cables westward of the ruins of the pier.

Chart, 3,314  
[2,676].  
Var.  $0^{\circ} 4'$  E.

Lat.  $16^{\circ} 39' N.$   
Long.  $120^{\circ} 15' E.$

At night approach the harbour with the leading lights in line, and when the light on San Fernando peninsula bears S.W.  $\frac{1}{4}$  S. steer S.S.E., and anchor when the outer (or lower) leading *red* light bears E.  $\frac{1}{2}$  S.

**Fagg reef.**, composed of sand and rock, about half a mile in extent, with a least depth of  $4\frac{1}{2}$  fathoms, lies 2 miles N.W. by N. from San Fernando peninsula lighthouse. This reef is sometimes marked by breakers.

**Rocky shoal.**—A small coral patch, of  $6\frac{1}{2}$  fathoms, steep-to, lies W.  $\frac{1}{2}$  S distant 10 miles from the north extreme of San Fernando point.

The COAST from San Fernando point trends northward 13 miles to Darigayos point, which is low, covered with trees, and surrounded by a reef; it thence trends north-eastward and northward for about 25 miles to Kandon point; Amburayan river discharges in the bay between. San Juan, 4 miles from San Fernando point, may be recognised by its church tower, near which is a belfry painted red. The town of Darigayos can be distinguished from the southward by the white roof of its church showing. Namagpahan, which shows plainly, has a church with three towers. Santa Lucia is the most conspicuous town along this part of the coast, and may be known by its church with a large white dome.

**Caution.**—During the north-east monsoon, a strong current has sometimes been experienced, setting to the northward, along this coast, and always with a tendency towards the shore. It and the coast northward as far as point Dile should be given a berth of about 3 miles, as it has not been examined. The Spanish sailing directions state there is a bank with one fathom least water, and 2 miles in extent, between San Estevan point and Solbek, but it is not shown on their charts.

Lat.  $17^{\circ} 14' N.$   
Long.  $120^{\circ} 24' E.$

**Kandon point** is low, fringed by a reef and covered with cocoanut trees. Anchorage is good to the southward of the point during the N.E. monsoon. A patch of  $2\frac{1}{2}$  fathoms lies about half a mile off Kaloag 2 miles southward of the point. The land in the vicinity of Kandon point is high, terminating to the north, at San Estevan point, in a cliff.

**LIGHT.**—From a white frame tower, near a stone house on the beach, about a mile southward of Kandon point, a *fixed red* light is exhibited, elevated 49 feet above high water, and visible at 7 miles when bearing from N.  $11^{\circ}$  W., through north, to S.  $58^{\circ}$  E.

**Telegraph.**—There is a telegraph station at Kandon.

**Santiago and San Estevan.**—At  $4\frac{1}{2}$  miles northward of Kandon point is the small port of Santiago, one cable wide.

At  $2\frac{1}{2}$  miles beyond Santiago is the port of San Estevan,  $1\frac{1}{2}$  cables in width and available for small craft, but open to the northward. Anchorage may be had off the entrance in a depth of 10 fathoms, at the distance of  $1\frac{1}{2}$  cables from the shore reef. Off the north point of the port lies

Darigayos bank extending about 4 cables to the westward, upon which Var. Nil. the least depth is  $1\frac{1}{2}$  fathoms.

A quarry on the side of the hill, about half a mile northward of the town, forms a good landmark, and steer for bearing S.  $83^{\circ}$  E. leads clear of Darigayos bank.

**Solbek bay** lies 6 miles northward of San Estevan point. The eastern shore of the bay is encircled by a reef which extends out a considerable distance; the western point also has a similar reef. Small vessels can anchor in front of the town sheltered from all except south-west winds. Agayayos point is conspicuous, and the sharply-defined Tetas de Santa, 1,407 feet high, are easily distinguished.

**POINT DILE**, the most salient point on this part of the coast, projects well out to the westward, but is low and not prominent from a distance. A shoal with a depth of  $2\frac{1}{2}$  fathoms is charted off the point, which should be given a good berth when being rounded.

Bulagao mountain, 3,629 feet in height, situated 11 miles E.N.E. from the point, is the most conspicuous landmark of this neighbourhood, showing two rounded peaks when seen from the southward. The mouth of the river Abra entering the sea at Dile point is nearly closed.

**Telegraph.**—There is a telegraph station at Dile point.

**Current.**—Between Dile point and Badok island, 22 miles to the northward, a current of  $1\frac{1}{2}$  knots an hour has been observed setting to the northward during the north-east monsoon.

**Vigan road**, south-eastward of Dile point, is sheltered from northerly winds by that point, but exposed to the southward and westward. A patch of  $3\frac{1}{2}$  fathoms lies about  $1\frac{1}{2}$  miles off shore at 3 miles southward of the point. The anchorage is in 8 to 12 fathoms, near the shore, with the southern mouth of the Abra river bearing about East; the bank shelves suddenly. About 9 miles inland E.N.E. of the road there is a gap between two mountains, named Abra de Vigan, which is conspicuous when viewed from the offing, and is a good mark for recognising this part of the coast. The town of Vigan, of some importance, is situated about  $2\frac{1}{2}$  miles north-east of the anchorage, on an eminence.

**Pandan**, 3 miles south-east of point Dile, the landing place of Vigan, is situated near one of the mouths of the Abra river. The anchorage here is somewhat sheltered from northerly winds, but when strong from that direction the ground swell follows round Dile point, causing a heavy surf, making the landing of cargo difficult and at times impossible.

**LIGHT.**—A *fixed red* light is exhibited from a white frame tower at Pandan, elevated 50 feet above high water, and visible 7 miles when bearing from N.  $35^{\circ}$  W., through north, to S.  $60^{\circ}$  E.

Chart, 3,283  
[2,675].  
Var. Nil.

**Directions.**—Approaching from seaward, steer in for Vigan road with the middle of Vigan gap bearing E.N.E., until the roof of a long, low, detached building, seen among the trees some distance to the right of the village on the beach, bears N.N.E.  $\frac{1}{4}$  E., when steer for it, going ahead slowly as the water shoals suddenly. Anchor when Dile point bears about N.W. by N., in a depth of from 8 to 10 fathoms, muddy bottom.

From the southward, head for the warehouses at Pandan bearing North, anchoring in 5 to 7 fathoms; the white roof of a church will be seen to the right of Pandan.

Lat.  $17^{\circ} 41' N.$   
Long.  $120^{\circ} 22' E.$

**Pinget island.**—The coast northward from Dile point is low and sandy to abreast Pinget island a distance of 7 miles. This island is very low, covered with trees, and situated nearly a mile off shore to which it is apparently connected by a sand ridge, with anchorage for small craft on the south side of the ridge. The island (difficult to distinguish under the mainland) has sandy shores and is surrounded by a reef which is steep-to on the western side. During the S.W. monsoon good anchorage may be had eastward of the north point of Pinget island, in a depth of 10 fathoms, mud. A shoal lies about a mile southward of Pinget island, and the same distance off shore.

**Lapog bay**, northward of Pinget island, is sheltered from all winds except those between S.W. and W.N.W.; and has depths of 5 to 7 fathoms, sand, until near the shore. The position of the bay will be recognised by mount Bulagao, 3,629 feet high, situated to the south-east.

**Shoals.**—There is a shoal in the centre of Lapog bay about a mile off shore, and one upon which a depth of  $4\frac{1}{2}$  fathoms has been found (but which has apparently only 3 fathoms), at the distance of  $1\frac{1}{2}$  miles S.W. by W. from the northern point of the bay; this latter shoal lies very near the track recommended for vessels entering the port of Salomague from the southward. Two other shoals, close together and about half a mile in extent with  $2\frac{1}{2}$  fathoms least water, are situated 2 miles W.  $\frac{1}{4}$  S. from Darrena point, the north point of Lapog bay; these may generally be seen in clear weather, and are steep-to. There is also a patch of  $4\frac{1}{2}$  fathoms between the latter shoals and the above point, from which shoal water, with a depth under 5 fathoms, extends two-thirds of a mile westward.

Lat.  $17^{\circ} 47' N.$   
Long.  $120^{\circ} 25' E.$

**Port Salomague**, northward of Lapog bay, is separated from it by Darrena point, which is fringed by a reef, and has the shoals before mentioned off it. This port, though open to westerly winds, is an important place during the south-west monsoon, when landing at Vigan is generally impracticable. There is a small pier near the warehouses and a stone tower and flagstaff on the northern shore.

The north point is surrounded with a reef, which extends southward from it for  $3\frac{1}{2}$  cables, and continues eastward, fringing the whole of the port to the distance of from one to  $1\frac{1}{2}$  cables. Chart. 3,283  
[2,675].  
Var. Nil.

**Shoal.**—A coral shoal, about 3 cables in length east and west, and one cable in width, with a least depth of 4 feet, lies a little southward of the centre of the harbour, with its western extreme half a mile north-eastward of the southern entrance point. The shoal can be made out in clear weather by the discoloured water on it.

**Buoys.**—A conical buoy, painted red, marks the west end of the reef in the middle of Salomague harbour, and lies with the stone tower bearing North, distant about 7 cables.

A can buoy, painted black, marks the south-west edge of the reef on the northern side of the entrance ; it lies with the stone tower bearing N.E.  $\frac{1}{4}$  N. distant half a mile.

**LIGHT.**—A *fixed red* light, elevated 39 feet above high water, is exhibited from a white frame tower on the eastern side of the harbour, situated about a mile S.  $54^{\circ}$  E. from the stone tower ; it is visible from a distance of 9 miles, when bearing from N.  $58^{\circ}$  E., through east, to S.  $66^{\circ}$  E.

**Directions.**—Port Salomague may sometimes be known from the offing by a gap in the mountains which overtop the rest of the chain within this coast, which when steered for, bearing East, will lead to the south end of Salomague island. This gap is said to somewhat resemble the gap of Vigan, but is not so large ; it is difficult to distinguish, and does not approach so near the sea as that gap. Pass within a mile of the island to avoid the  $2\frac{1}{2}$ -fathoms patches southward of it, and thence midway between the points of the port, and past the buoys, rather inclining towards the northern shore, and anchor in from 7 to 8 fathoms. The best berth to moor is in about  $7\frac{1}{2}$  fathoms, sand and mud, with the tower on the north shore bearing North, distant about 4 cables. Coasting steamers call here monthly.

**Salomague island**, about two-thirds of a mile in length, of moderate height and thickly wooded, lies about a mile north-west of the north point of port Salomague ; a reef extends about  $1\frac{1}{2}$  cables from its south end. In the channel, between the island and the mainland, that is sometimes used by small steamers, there is a depth of 5 fathoms.

**The coast** intervening between Salomague island and Badok, 7 miles to the northward, is rocky, and a reef extends nearly a mile off shore between Kabugao and Sinait. Off Kabugao river there is anchorage in a depth of 6 to 7 fathoms, sand.

**Shoals.**—A shoal, with one fathom water, lies  $2\frac{1}{2}$  miles N.E.  $\frac{1}{4}$  N. from Salomague island ; a rocky bank with 7 to 8 fathoms, lies 4 miles north of the island.

Vnr. Nil.  
Lat.  $17^{\circ} 55' N.$   
Long.  $120^{\circ} 25' E.$

**Badok island** is flat, 112 feet high, and has one small tree near the centre of the island, which is a prominent landmark. It is surrounded by a reef, and lies three-quarters of a mile from Solot point. Between Badok and the mainland there is a passage half a mile broad, with a least depth of about 6 fathoms in it.

**The coast** from Badok island trends northward for 10 miles to Kulili point; midway is Gan bay, with reefs extending  $1\frac{1}{2}$  miles from the coast, which appear to block it entirely.

**Port Kurrimao**, immediately north of Gan bay, is a cove open to the south-west, with depths of 4 fathoms, sand. The old fort on its eastern shore has been whitewashed.

**LIGHT.**—A *fixed red* light is exhibited from the old stone fort, half a mile southward of Kurrimao village, elevated 27 feet above high water, and visible from 7 miles, when bearing from  $N. 24^{\circ} E.$ , through east, to  $S. 49^{\circ} E.$

**Kulili point** is a conspicuous bold bluff, 91 feet high, abrupt and rocky, without trees, and connected with the mainland by a low sand strip.

Lat.  $18^{\circ} 13' N.$   
Long.  $120^{\circ} 33' E.$

**Mount Kauit**, a sand hill about 300 feet high, partially covered with bushes, and situated near the shore 9 miles northward of Kulili point, forms a conspicuous mark on this low coast. Laoag river enters the sea close southward of the mount; the town of Laoag is about  $4\frac{1}{2}$  miles up the river; here there is a telegraph station.

Anchorage may be taken off Laoag river, in a depth of 7 fathoms, with mount Kauit in line with its entrance, bearing N.E., and Kulili point S.S.W. A bar closes entrance to the river. The depths decrease rapidly from 10 to 5 fathoms.

**The coast** from mount Kanit trends northward for 17 miles to cape Bojeador, southward of which is Dirikwi creek. This coast is low with a sandy shore, the country in the interior being very high. Within 5 miles southward of the cape the coast is cliffy, and fringed by a reef as far as cape Bojeador. Temporary anchorage will be found along this coast during the north-east monsoon; the soundings are regular, decreasing from 13 to 7 fathoms, hard bottom, the latter depth at the distance of about a mile from the shore.

**Dirikwi creek.**—During the north-east monsoon good anchorage can be obtained off Dirikwi creek in a depth of 12 to 15 fathoms, sand, with cape Bojeador lighthouse bearing N.N.E.; or inside, in 6 to 10 fathoms, where there is shelter except from the south-west, and swinging room for a vessel 250 feet in length. The points on both sides are fringed with coral reefs that dry out a considerable distance at low water.

**CAPE BOJEADOR**, the north-west extreme of Luzon, is about Var. Nil. 300 feet in height, sloping down to its extreme point; it is surrounded by a reef, which projects about  $1\frac{1}{2}$  miles seaward and extends 2 miles north-eastward of it, and to the southward beyond Dirikwi creek. The reef off this cape was struck by the s.s. *Centennial* when about 2 miles west of the lighthouse, the least depth obtained being 16 feet. Vessels should give this cape a good berth.

**LIGHT**.—From a truncated brick pyramid, with a broad white central band and white cupola, 65 feet in height, erected on a hill nearly a mile eastward of the extreme of the cape, is exhibited at an elevation of 360 feet above high water, a *flashing white* light with a period of *one minute*, the duration of the *flash* being *fifteen seconds*. The light is visible seaward between the bearings of N.  $14^{\circ}$  E. and S.  $56^{\circ}$  W. from a distance of 26 miles in clear weather.

**Telegraph**.—There is a telegraph station on cape Bojeador.

**Current**.—During the north-east monsoon a current of  $1\frac{1}{2}$  knots an hour has been observed setting to the northward in the vicinity of cape Bojeador.

**Coast**.—From cape Bojeador the coast trends in a north-east direction 6 miles to Negra point, on the east side of which anchorage may be obtained during southerly winds. The deep bay between this point and Dialao point, 9 miles north-eastward, has also anchorage off Bangui (telegraph station), at the head of the bay. Dialao point, the eastern extreme of this bay, is fringed by a reef, and there is a shoal with less than 6 feet water about one mile south-west of Burayot point within Dialao point.

Mayraira point, the north extreme of Luzon, distant about 20 miles north-east of cape Bojeador, is fringed by rocks, and patches with  $3\frac{1}{2}$  to 5 fathoms over them, lie at the distance of a mile from the point. Lakay-lakay point, bearing about E.  $\frac{1}{4}$  S. 9 miles from Mayraira point, is a bluff steep point of white cliffs, having a mass of high land, called Patapat mountains, contiguous to it.

To the eastward of Lakaylakay point there is a round hill of middling height, named point Pata. The whole of the coast from cape Bojeador to this place is steep; the land is of moderate height, and in some parts rather low close to the sea, with several rivers; but the country inland is mountainous. Strong eddies and tide rips are usually found off this locality.

For the description of the continuation of the coast of Luzon, see Eastern Archipelago, Part I.

**Pratas reef and Vereker bank**, situated in the track of vessels between Hong Kong and Cape Bolinao, are described on pages 129-131.

## CHAPTER XI.

## GULF OF SIAM.

## WESTERN SHORE OF THE GULF.

(Coast *continued* from page 108.)

Charts, 1,355  
[2,513].  
698 [2,684].  
Var. 1 $\frac{1}{2}$ ° E.

**General remarks.**—Northward of the state of Pahang, under British protection, is the Malay state of Tringano, and beyond it, between Besut river and Kelantan river is the Malay state of Kelantan, both belonging to Siam. The country inland is a vast forest with only narrow foot-paths, and is watered by numerous streams; in Tringano there are no less than twelve, the principal of which bears the name of the State; some of these compare favourably with the Rumpin and Kuantan in Pahang. The Kelantan river in Kelantan state is navigable by light steam launches to Kwala Sungi, about 100 miles from the sea, and unlike the Tringano is but little obstructed by rapids.

During the north-east monsoon period trade may be considered closed, as these rivers are impracticable except at high-water springs combined with moderate or fine weather; small coasting steamers run regularly, fortnightly, entering the rivers at the time mentioned when practicable. During the south-west monsoon period the sea is calm and trade in the rivers is more or less brisk. The products are similar to those mentioned with Siam in the first chapter, page 3.

The coast is composed of bright sandy beaches, interspersed with rocky points and in places massive headlands, and unlike the west coast of the peninsula is free from mangrove.

Lat. 4° 47' N.  
Long. 103° 27' E.

**COAST.**—From Tanjung Dungun, abreast Pulo Brala, the coast trends north-north-westward to Tringano head, with Pulo Kapas about 3 miles in the offing. Siatin rocks are the only known danger.

**Siatin rocks** are two in number; the outer one, with a depth of 6 feet, and 8 fathoms at a short distance around, lies 1 $\frac{2}{3}$  miles off shore with the mouth of Siatin river bearing S.S.W.  $\frac{1}{8}$  W., distant about 2 $\frac{1}{2}$  miles; the other has a depth of 11 feet and lies 2 cables westward of the outer rock.

Lat. 5° 13' N.  
Long. 103° 18' E.

**Pulo Kapas**, the south-west point of which is in the position given, is 1 $\frac{1}{2}$  miles in length, north and south, three-quarters of a mile in breadth, and 478 feet in height. A large rock lies one cable north-west of it, and the south-west side of the island is foul to a short distance. The

island is fertile, and inhabited by fishermen, who cultivate a few vegetables for their own consumption.

Charts, 998  
[2,684].  
1,355 [2,513].  
Var. 1° E.

**Tringano head**, situated 5 miles west-north-westward of Pulo Kapas, is remarkable as the only rocky point in the neighbourhood.

A rock awash at high water lies a quarter of a mile from the beach, and  $1\frac{1}{2}$  miles southward of Tringano river entrance.

**TRINGANO RIVER.**—The entrance to this river may be known by the large opening it makes in the coast line, as well as by a remarkable hill, 755 feet in height, in the form of a cone, situated one mile southward of the town. There is also in the town on the river front a steep hill, 100 feet high, with a fort, and flagstaff. The river has a bar with a depth of 7 feet at low water springs; within the bar, and just below the town, there is good anchorage in 4 to 5 fathoms, but the river abreast of the town is shallow.

Plan on chart  
998 [2,684].  
Lat. 5° 22' N.  
Long. 103° 8' E.

Wood, water, and fresh stock can be procured.

**Tides.**—It is high water, full and change, at the entrance of Tringano river, at 8 h.; springs rise 7 feet.

**COAST.—Eulo rocks.**—The coast from the entrance of Tringano trends north-westward about 9 miles, and is low to Eulo village, where the high land approaches close to the beach. Eulo rocks, a small group 6 feet high, lie off the village,  $1\frac{1}{2}$  cables from the beach.

**Seal bluff** lies 6 miles north-westward of Eulo, and is situated  $2\frac{1}{2}$  miles northward of a cone-shaped hill 675 feet in height. The whole of the coast from Tringano river is fronted by a shallow bank to the distance of about a mile.

From the bluff the coast continues its north-western direction for about 60 miles to the mouth of Kelantan river, with several off-lying islands. Lebih river discharges about 15 miles north-westward of the bluff, and within it is a mountain range 3,388 feet in height.

The coast is low and fronted by a sandy beach until within 2 miles of Turtle-back island, 346 feet high and 2 miles offshore, where there are two bluffs. From abreast Turtle-back island to about 15 miles northward, it is fronted by a bank with less than 3 fathoms water.

**Seal rocks** consists of three rocks, the extreme of which lie north and south, nearly a mile apart. The southernmost rock is 7 feet high, the middle rock 2 feet, and the northernmost 3 feet.

Lat. 5° 34' N.  
Long. 103° 0' E.

The southernmost rock lies nearly  $2\frac{1}{2}$  miles from Seal bluff, having a channel between it and the bluff, with depths of 6 to 8 fathoms. A rock, awash at low water, lies a quarter of a mile north of the bluff. Both should be given a berth of half a mile.

Chart, 98 [2,684].  
Var. 1 $\frac{1}{2}$ ° E.

**Bukit Trokit** is a rock 140 feet high, situated 4 miles northward of Seal rocks. There is a smaller rock, 5 feet high, lying nearly a mile westward of Bukit Trokit.

**House rock**, lying N.W. 10 $\frac{1}{4}$  miles from Seal bluff, is so named from its appearance.

Lat. 5° 38' N.  
Long. 103° 4 $\frac{1}{4}$ ° E.

**OFF-LYING ISLANDS.** — Little Redang island, 985 feet high, lies 7 $\frac{1}{2}$  miles north-eastward of Seal bluff; there is an islet half a mile south of Little Redang, with 11 fathoms water between.

**Pulo Gulu** is an islet situated 1 $\frac{1}{2}$  miles north of Little Redang, with Tikoro, a smaller one, a quarter of a mile from its north extreme.

**Pulo Yu Kuchi and Pulo Yu Besar**, situated 5 miles east of Little Redang, are two islets a mile apart in a north and south direction, with 24 fathoms midway between them. Pulo Yu Kuchi (Kechil), the southern island, is 209 feet high ; Pulo Yu Besar is 316 feet in height.

**Great Redang**, 1,139 feet high, situated 12 miles northward of Seal bluff, is 4 miles in length, north and south, 3 miles in breadth, and fairly steep-to all round. It has several islets and rocks on its south and east sides, but they are all steep-to. The island is thickly wooded, and a valley with mangrove swamp and a fresh water stream running down to the harbour, divides it from north to south.

There is a bay on the north side, and a small harbour on the south side of the island, the heads of which are connected by low land, giving to Great Redang the appearance of two islands at a distance. The harbour\* is protected to the southward by Pulo Pinang, and, although small, might be useful to a small vessel in distress, being easy of access. A coral reef extends about 50 yards off the east point of the harbour, increasing to about a cable off the bight within the harbour. In the approach, at 1 $\frac{1}{2}$  cables N. by W.  $\frac{1}{2}$  W. from Bukit Mara, is a rock awash at low water.

The passage northward of Pulo Pinang has a depth of 5 fathoms, but it is only a cable wide, and dangerous when the tidal stream runs strong. The most open approach to the harbour is eastward of Pulo Pinang in a least depth of 3 $\frac{1}{2}$  fathoms.

**Anchorage.**—A vessel requiring wood and water in the south-west monsoon can anchor in a depth of 10 fathoms, with Bukit Mara, a small islet off the south part of the island, bearing South distant half a mile.

**Village.**—There is a village on Pulo Pinang, and a few huts scattered in different parts of Great Redang. The chief man holds his office from the Rajah of Tringano. Turtle may be caught in the proper season on the beach at the north end of Redang.

**Pulo Latinga**, 520 feet high, lies 5 miles west of Great Redang.

Plan on chart,  
998 [2,684].  
Lat. 5° 45' N.  
Long. 103° 1' E.

**Printian islands.**—This group, lying about 15 miles north-westward of Great Redang, is also safe to approach. The channel between the two large islands,\* the easternmost of which is 1,134 feet, and the westernmost 1,195 feet in height, is nearly half a mile wide in the narrowest part, in which rocks above water extend a considerable distance from the eastern island. There is good anchorage for small craft on either side of the channel, but the most secure is to the southward.

Chart, 298 [2,084].

Var. 11° E.

Lat. 5° 54' N.

Long. 102° 45' E.

The islands are inhabited, but fresh water is scarce. The channel between the large islands and High rock, 735 feet in height, with off-lying islets, 2 miles to the north-westward, has a depth of about 12 fathoms in the fairway.

The channel within the Printian islands is safe. There are no dangers that are not apparent, and attention to the lead will always indicate the distance from the land.

**Water.**—The only convenient watering place along this line of coast is at Great Redang island.

**KELANTAN RIVER.**—The delta of this river, formed by the deposits brought down by the several streams, has resulted in a considerable projection of the coast line, with a shallow bank extending some 2 miles seaward of it. It consists of five mouths which connect below the town. The main entrance, in 1902, opposite the light-structure and eastward of the sandspit shown on the plan, was very shallow, and both the depth and direction of this and the other branches are continually changing; the entrances are sometimes blocked up altogether after gales of wind and new ones formed. The river at the town is about 2 cables broad and 2 fathoms deep; its banks here are very sandy.

The river is about 80 miles in length, taking its rise near the summit of the inland range of mountains to the south-westward.

The river is navigable for nearly its whole length for steam launches drawing 2 feet. June and July are the months when there is least water in the river.

**Directions.**—Vessels approaching the river from the south-eastward will be guided to it somewhat by three small hills, situated near the coast 12 miles to the southward, but they are said not to be conspicuous. Two of these hills, named the Paps, are 300 feet high; the third, Wedge hill, is 400 feet in height. The Paps will be in line with the sandy point near the entrance of the river when bearing S. by E.  $\frac{2}{3}$  E. The light-structure makes a good daymark for approaching the river. There is open anchorage off the mouths of the river in depths of 6 to 12 fathoms.

**LIGHT.**—On the mainland, near the western end of the delta of the river, from a square wooden structure, painted white, a *fixed red* light is

Lat. 5° 13' N.

Long. 102° 11' E.

General chart, 2,414 [2,682].

E 32369.

Z

Chart, 998 [2,684], exhibited, at an elevation of 87 feet above high water, visible in clear weather at the distance of 5 miles.

Chart, 998 [2,684], exhibited, at an elevation of 87 feet above high water, visible in clear weather at the distance of 5 miles.

Chart, 998 [2,684], exhibited, at an elevation of 87 feet above high water, visible in clear weather at the distance of 5 miles.

**The town** of Kelantan, or Kota Bahru, stands on the right bank of the main river, 13 miles from the entrance, near the confluence of its delta, which consists of five streams. It extends about a mile along the river front, and has a population of about 20,000 inhabitants, the greater part being Malays and Chinese. The houses are built chiefly of bamboo and atap. There are two markets in the town, the principal one being near the Rajah's palace.

The whole delta of the river is fertile and highly cultivated; it produces quantities of cocoanuts, a great variety of fruits and vegetables, maize, rice, tobacco, &c. Bullocks, sheep, goats, and fowls are plentiful.

**Trade.**—A considerable amount of trade in cattle, rice, and produce is carried on. The import and export duties collected by the Rajah amount to about 700,000 dollars annually.

**Telegraph.**—There is a telegraph station at Kelantan.

**The COAST** for 40 miles north-westward of Kelantan river has not been surveyed, but is believed to be safe to approach.

It is low land as far as the conical hill, 1,158 feet in height, on the coast about midway.

A range of mountains, attaining a height of 2,643 feet, lies about 8 miles within the coast farther northward.

Lat. 8° 41' N.  
Long. 101° 44' E.

**Baltu Rakil** is a white rock, 35 feet in height, and steep-to; between it and the mainland there is a channel 3 miles wide, with depths of 6 to 7 fathoms in the fairway.

**HILLY CAPE** is the northern extreme of a chain of hills which attain a height of 1,636 feet in Bukit Tuna, 7 miles within, southward of which is a Table range 1,304 feet high. The cape is remarkable from its two steep bluffs Grigre and Burrawas.

Lat. 7° 21' N.  
Long. 102° 0' E.

**PULO LOZIN** lies 40 miles north-eastward of Hilly cape; it is about 100 feet in length, 7 feet high, and steep-to all round. A depth of 29 fathoms was obtained at 1½ cables S.S.E. of it.

**TANJONG PATANI** is a low narrow sandy point covered with high trees, situated 16 miles west-north-westward of Hilly cape.

**Loftus bank**, of hard sand, with depths of 1½ to 3 fathoms, is 3 miles in length, and lies parallel to and 1½ miles distant from the coast eastward of Tanjong Patani, between which there are depths of 3 to 4 fathoms, mud.

**Patani road**, about 4 miles westward of Tanjong Patani, affords anchorage in 3 to 5 fathoms, mud, the depths decreasing gradually towards the shore.

Chart. 908 [2,684],  
with plan of  
Patani road.  
Lat. 6° 57' N.  
Long. 101° 16½' E.  
Var. 11° E.

The high trees on the eastern bank of Patani river, bearing S.E., is a good mark to approach the anchorage. The depths are irregular northward of Tanjong Patani.

The town of Patani stands on the eastern bank of the river about half a mile within the entrance, and is said to be a good place at which to purchase stock.

**Enemy Chaser shoal**, with a least depth of 1½ fathoms, lies 3 miles off shore, with Tanjong Patani bearing E. by N. ¼ N. 11½ miles.

**Tides**.—It is high water, full and change, in Patani road, at 10 h.; springs rise 2½ to 3 feet.

**The COAST** from the entrance of Patani river is low and trends in a westerly direction for about 18 miles to Kampong Tibu, thence north-westward to a sharp point, the termination of a ridge which backs the coast for the previous 7 miles. Within it is Table-top, 740 feet in height. Sungi Sokong discharges in the bay westward of the point.

**Pulo Chelaji**, a small islet, 133 feet in height, lies about half a mile off the above sharp point, with rocks around it. Lat. 6° 58' N.  
Long. 100° 52' E.

From the bay abreast, the coast again becomes low, and continues so to near Singora, about 21 miles north-westward.

At about 2 miles southward of the entrance to Singora, is Lem Kau Rong, the northern termination of a range of mountains 17 miles in length, and attaining a height of 1,858 feet at its southern end.

The 3-fathoms edge of the bank fronting this coast extends about a mile off, and there are apparently no outlying dangers.

**SINGORA**.—The walled town of Singora is situated on the south side of the southern entrance to Tale Sap, an inland sea or lake which extends about 40 miles in a north-north-west direction parallel to the coast, with a breadth varying from 2 to 8 miles.

The population of the town, and suburbs across the water, in 1896 was estimated to be 10,000, partly Siamese and partly Malay. There are some 60,000 people in the province, scattered in small communities along the shores of the lake and in the jungle of the interior. Rice, tin, fish, skins, and horns are the principal products, sufficient to keep a considerable fleet of junks running to Singapore, Bangkok, &c.

**The lake**, Tale Sap, is separated from the sea by a low sand ridge known as Kau Yie; it has numerous islands in it, and the southern portion is navigable by small craft, there being a depth of about 9 feet on the western side which is the deeper, for some distance. Its northern

Chart, 998 [2,684], portion is shallow, and the town of Patalung, on the western shore, can only be approached by small native boats. The lake is decreasing in depth; some 55 years ago, it is stated, there was a deep water channel from Lakon (Lakawn) road to the northward, into the lake, now only navigable by boats of 2 feet draught.

Lat.  $7^{\circ} 13' N.$   
Long.  $100^{\circ} 33' E.$

**The entrance to Singora harbour** is about half a mile wide between the points, above which are the hills Kau Deng Yie, 598 feet in height, with two pagodas on the western side, and that of Kau Tang Kwan with one pagoda on the eastern side; its approach is obstructed by shallow flats and quicksands, dry in places to the distance of about a mile; Koh Gnu, the island in the approach, is within the 3-fathoms line fronting the entrance.

**The bar**, and the middle ground within the entrance, are continually changing in form and depth, owing to the strong ebb stream, and to the heavy seas which break into the harbour during the north-east monsoon; the channel should therefore be buoyed before attempting to enter. The plan shows a depth of one fathom on the bar between North and South banks, deepening to 3 or 4 fathoms between South bank and the west entrance point of the harbour. There is a narrow channel with 2 to 3 fathoms water as far as the town, about one mile up, by keeping close to the eastern shore. See preceding remarks on the lake within.

**Off-lying islets.**—Koh Gnu, one-third of a mile in length, and 279 feet in height, lies  $1\frac{1}{2}$  miles off the entrance; Koh Mu, 149 feet in height, lies  $1\frac{1}{2}$  miles northward of it, with the Luk Mu Nai rocks, one of which is 6 feet in height, between. Luk Mu Nok rocks, one of which is 4 feet high, lie two-thirds of a mile north-eastward of Koh Gnu, and there is said to be a patch of  $2\frac{1}{2}$  fathoms between.

**Directions.—Anchorage.**—Singora is easily identified by the hills with pagodas on them on either side of the entrance, and by the islands in the offing.

During the north-east monsoon small vessels may anchor in  $2\frac{1}{4}$  fathoms, mud, about a quarter of a mile from the south-west side of Koh Gnu; and during the south-west monsoon, in  $2\frac{1}{2}$  fathoms at half a mile south of this island. Large vessels should anchor in 5 or 6 fathoms with the south extreme of Koh Gnu bearing West.

**Supplies.**—Wood and water may be purchased at the town, or the latter may be obtained from a spring within the bar on the west side. Stock of every description is plentiful. There is frequent overland communication between Singora and Penang.

**Tides.**—It is high water, full and change in Singora harbour at 8 h. 30 m.; springs rise 2 to  $3\frac{1}{2}$  feet in the south-west monsoon. During

the north-east monsoon the tide rises 6 feet, covering the North and South banks, and also the cluster of rocks adjacent to Lem Miva, nearly a mile east of the entrance. The flood stream runs to the northward and the ebb to the southward in the road at the rate of 2 to 3 knots.

**The COAST** from Singora trends northward to Lem Kolam Puk, and is low and sandy, with trees in places, for the whole distance; the lake or inland sea within apparently discharges occasionally through the coast, known as Kau Yie, some 40 miles from Singora; there are a few scattered huts or small villages on the coast. It is fronted by a bank with less than 3 fathoms to the distance of from about one to  $1\frac{1}{2}$  miles, into which the depths gradually decrease, with a mud bottom. There are no known dangers off it.

**Lem Kolam Puk** is a narrow curved spit of coarse sand, 6 miles in length by 100 yards in breadth, with a cluster of fir trees on its extremity; Lem Kolam spit is the continuation of the point under water for a distance of about 4 miles northward, within which is Lakon bight.

**Lakon bight and road.**—Lakon bight, about 9 miles in length, by 6 miles in breadth between its entrance points, is almost filled with mud, there being but little water over any part of it. At its head is the Klong Pakinang or Ranawt, which leads to Tale Sap, the lake or inland sea to the southward, navigable by boats of 2 feet draught. The head of the bight is only navigable for boats at near high water. The depth in Lakon road is reported to be decreasing.

**The town** of Lakon or Lakawn is charted about 6 miles westward of the west shore of the bight, and is stated to be about 5 hours pull up a very shallow stream (possibly in a laden canoe). The state of Lakon contains some 130,000 inhabitants and is the most populous and richest of the Siamese states of the peninsula, but owing to the exposed character of the road and the insignificance of the stream, Lakon is but rarely visited. Lakon road affords anchorage in the south-west monsoon period in a depth of about 4 fathoms, at about 5 miles northward of the west point of entrance to Lakon bight.

**Directions.**—Small craft, bound to Lakon road from the southward, should round Lem Kolam Puk at a distance of not under 5 miles, thence steering to the westward and anchoring according to draught. If from the northward, keep inshore, and anchor in a suitable depth near the inner fishing stakes. Sailing craft can usually work up in shore against the south-west monsoon.

It is high water, full and change, in Lakon road at 10 h. 15 m. Springs rise  $4\frac{1}{2}$  feet (in the south-west monsoon).

Chart 998 [2,684], portion is shallow, and the town of Patalung, on the western shore, can only be approached by small native boats. The lake is decreasing in depth; some 55 years ago, it is stated, there was a deep water channel from Lakon (Lakawn) road to the northward, into the lake, now only navigable by boats of 2 feet draught.

Lat.  $7^{\circ} 18' N.$   
Long.  $100^{\circ} 35' E.$

The entrance to Singora harbour is about half a mile wide between the points, above which are the hills Kau Deng Yie, 598 feet in height, with two pagodas on the western side, and that of Kau Tang Kwan with one pagoda on the eastern side; its approach is obstructed by shallow flats and quicksands, dry in places to the distance of about a mile; Koh Gnu, the island in the approach, is within the 3-fathoms line fronting the entrance.

The bar, and the middle ground within the entrance, are continually changing in form and depth, owing to the strong ebb stream, and to the heavy seas which break into the harbour during the north-east monsoon; the channel should therefore be buoyed before attempting to enter. The plan shows a depth of one fathom on the bar between North and South banks, deepening to 3 or 4 fathoms between South bank and the west entrance point of the harbour. There is a narrow channel with 2 to 3 fathoms water as far as the town, about one mile up, by keeping close to the eastern shore. See preceding remarks on the lake within.

**Off-lying islets.**—Koh Gnu, one-third of a mile in length, and 279 feet in height, lies  $1\frac{1}{2}$  miles off the entrance; Koh Mu, 149 feet in height, lies  $1\frac{1}{2}$  miles northward of it, with the Luk Mu Nai rocks, one of which is 6 feet in height, between. Luk Mu Nok rocks, one of which is 4 feet high, lie two-thirds of a mile north-eastward of Koh Gnu, and there is said to be a patch of  $2\frac{1}{2}$  fathoms between.

**Directions.—Anchorage.**—Singora is easily identified by the hills with pagodas on them on either side of the entrance, and by the islands in the offing.

During the north-east monsoon small vessels may anchor in  $2\frac{3}{4}$  fathoms, mud, about a quarter of a mile from the south-west side of Koh Gnu; and during the south-west monsoon, in  $2\frac{1}{2}$  fathoms at half a mile south of this island. Large vessels should anchor in 5 or 6 fathoms with the south extreme of Koh Gnu bearing West.

**Supplies.**—Wood and water may be purchased at the town, or the latter may be obtained from a spring within the bar on the west side. Stock of every description is plentiful. There is frequent overland communication between Singora and Penang.

**Tides.**—It is high water, full and change in Singora harbour at 8 h. 30 m.; springs rise 2 to  $3\frac{1}{2}$  feet in the south-west monsoon. During

the north-east monsoon the tide rises 6 feet, covering the North and South banks, and also the cluster of rocks adjacent to Lem Miva, nearly a mile east of the entrance. The flood stream runs to the northward and the ebb to the southward in the road at the rate of 2 to 3 knots.

Charts, 996  
[2,684].  
989 [2,685].  
Var. 11° E.

**The COAST** from Singora trends northward to Lem Kolam Puk, and is low and sandy, with trees in places, for the whole distance; the lake or inland sea within apparently discharges occasionally through the coast, known as Kau Yie, some 40 miles from Singora; there are a few scattered huts or small villages on the coast. It is fronted by a bank with less than 3 fathoms to the distance of from about one to  $1\frac{1}{2}$  miles, into which the depths gradually decrease, with a mud bottom. There are no known dangers off it.

**Lem Kolam Puk** is a narrow curved spit of coarse sand, 6 miles in length by 100 yards in breadth, with a cluster of fir trees on its extremity; Lem Kolam spit is the continuation of the point under water for a distance of about 4 miles northward, within which is Lakon bight.

**Lakon bight and road.**—Lakon bight, about 9 miles in length, Lat. 8° 33' N.  
Long. 100° 3' E. by 6 miles in breadth between its entrance points, is almost filled with mud, there being but little water over any part of it. At its head is the Klong Pakinang or Ranawt, which leads to Tale Sap, the lake or inland sea to the southward, navigable by boats of 2 feet draught. The head of the bight is only navigable for boats at near high water. The depth in Lakon road is reported to be decreasing.

**The town** of Lakon or Lakawn is charted about 6 miles westward of the west shore of the bight, and is stated to be about 5 hours pull up a very shallow stream (possibly in a laden canoe). The state of Lakon contains some 130,000 inhabitants and is the most populous and richest of the Siamese states of the peninsula, but owing to the exposed character of the road and the insignificance of the stream, Lakon is but rarely visited. Lakon road affords anchorage in the south-west monsoon period in a depth of about 4 fathoms, at about 5 miles northward of the west point of entrance to Lakon bight.

**Directions.**—Small craft, bound to Lakon road from the southward, should round Lem Kolam Puk at a distance of not under 5 miles, thence steering to the westward and anchoring according to draught. If from the northward, keep inshore, and anchor in a suitable depth near the inner fishing stakes. Sailing craft can usually work up in shore against the south-west monsoon.

It is high water, full and change, in Lakon road at 10 h. 15 m. Springs rise  $4\frac{1}{2}$  feet (in the south-west monsoon).

Charts, 998  
[2,684].  
989 [2,685].  
Lat.  $8^{\circ} 25' N.$   
Long.  $100^{\circ} 45' E.$   
Var.  $11^{\circ} E.$

**KOH KRAH**, lying about 31 miles from the coast enclosing Lakon bight, is half-a-mile in length, and 530 feet high. Two rocks, 265 feet and 152 feet in height, and a rock 4 feet high (nearly awash at times), lie to the southward. Turtle are plentiful in the season.

**Coast.—Aspect.**—The following remarks are chiefly written from chart No. 989 [2,685].

From Lakon bight the coast trends nearly north to Devils and North-east points, forming the west side of Samui strait.

This coast is all low except at Lem Kwang and Lem Ple Dam, where at about one mile inland there are hills 489 feet and 708 feet high, respectively; several small streams discharge through it, with unimportant villages near them. The depths gradually decrease to the mud bank which fronts the shore to the distance of half a mile.

Lat.  $8^{\circ} 2' N.$   
Long.  $90^{\circ} 57' E.$

**A rock**, with 2 feet over it at low water, is reported by the native pilots to lie  $1\frac{1}{2}$  miles off Lem Ple Dam; the assigned position should be given a berth until disproved.

About 12 miles within the coast line is the Kau Lu Ong range of mountains 5,814 feet in height, with Needle peak 5,274 feet, and Sharp cone 2,594 feet in height, conspicuous points on it. Northward of this range are the Kau Prong 4,480 feet in height, and near the coast the Kau Kwang 2,670 feet. Ten miles within Devils point is the Kau Pra Nom, 1,805 feet, with Horn hill (Kau Kwie) between it and North-east point.

Devils point is distinguished by five peaks, known as the Five Devils, one of which is 796 feet in height.

Lat.  $8^{\circ} 16' N.$   
Long.  $90^{\circ} 53' E.$

**SAMUI STRAIT** lies between the north-east extreme of the peninsula (within which is the large and shallow bay known as Bandon bight), and the islands off-lying it. Between North-east point and Koh Kahten, the channel is 6 miles in width; in it there are five islets with deep water around them. The best passage, about three miles wide, known as West channel, lies between West island and the mainland; the eastern portion of this for a width of a mile or more has depths of about 8 fathoms. Its continuation northward, named Middle passage, has a depth of about 6 fathoms; but the channel to the westward, between Koh Mukapau and Koh Pahlicum, known as South passage, gradually decreases in depth to Bandon bight, which is only available for small craft.

The coast northward of North-east point is fronted by a bank with less than 3 fathoms to the distance of 3 miles, and on the bank, 2 miles off-shore, is a rock 313 feet in height.

**The tidal streams** probably run with considerable strength in the strait, as the flood, without the strait, is charted as running at the rate of  $3\frac{1}{2}$  knots to the northward.

**West island**, 236 feet in height, a narrow island nearly a mile in length and surrounded by rocks, is the westernmost island in Samui strait. Koh Kwang, 250 feet high, and Koh Rap, which is low, are both fringed with rocks; White rocks, above water, lie northward of the above islands, and Smith islet farther in the same direction. There is deep water between all of them.

Koh Kahten is a triangular island  $2\frac{1}{2}$  miles in length, 774 feet in height, and surrounded by reefs; Mat Sum lies eastward of it. Between these islands and Koh Samui are several dangers (rendering the passage impracticable), with Au Koh Wan, 6 feet high, on a detached reef eastward of them. Koh Hah, 268 feet high, with other rocks above water, lie off the south-west side of Koh Samui.

**Koh Samui**, the largest of the off-lying islands, is about 12 miles in length, about 7 miles in breadth, and attains a height of 2,269 feet in Kau Yie, its summit. It belongs to the state of Lakon. The island is surrounded by islets and shoals, for which see the chart. There are several small villages on the island inhabited by some hundreds of Chinese, who cultivate the cocoanut palm and rear large numbers of pigs and buffalo. There is some tin in the hills, but owing to the lack of water, it has not been worked with success. The island is clothed with dense forest, consequently the villagers communicate along the coast.

Anchorage will be found in the bays on either side, according to the prevailing monsoon.

**Koh Pennan**, 9 miles in length and 6 miles in breadth, attains an elevation of 2,220 feet; it is separated from Samui by a channel 5 miles wide with depths of 7 to 10 fathoms, and belongs to the state of Chiya. Table rock, 10 feet high, and Tong Krok, 83 feet high, mark the eastern limits of Pennan channel. The island is fringed by a reef except on its south-east side. The small islets, Koh Klian, 80 feet, and Koh Tau, 397 feet in height, lie off its west side. There is anchorage around it according to the monsoon.

**Koh Tau**, the northernmost island of the group, lies 19 miles north-north-westward of Koh Pennan, with Tau passage between, in which there is a general depth of about 20 fathoms; Sail rock, 65 feet high, lies in the fairway. The island is  $4\frac{1}{2}$  miles in length and 1,285 feet in height at its north-west extreme. Its west side is fringed by a reef, with islets, one of which, 387 feet in height, lies off its north-west extreme.

**Inner islands**.—Parallel to the islands above mentioned, at about 13 miles to the westward, are a number of islands extending about 30 miles in a north and south direction, nearly all of them within the 5-fathoms contour-line fronting Bandou bight. They form a breeding place for a large number of swiftlets which produce the edible nests.

Chart, 960 [2,685].  
Lat.  $9^{\circ} 16\frac{1}{2}'$  N.  
Long.  $99^{\circ} 54\frac{1}{2}'$  E.  
Var.  $11^{\circ}$  E.

Chart. 989 [2,685].    **Koh Mukapau**, the southernmost, is 570 feet in height and nearly 2 miles in length; it is surrounded by reefs.  
 Lat.  $9^{\circ} 22' N.$   
 Long.  $99^{\circ} 40' E.$   
 Var.  $11^{\circ} E.$

**Koh Taluei**,  $6\frac{1}{2}$  miles northward of Mukapau, is the largest, being 3 miles in length and 1,246 feet in height. Between them are Koh Som, Gnueh Cheu, and Koh Cheuk, 381, 411, and 450 feet high, respectively.

**Koh Angtong**, the next northward, is  $2\frac{1}{2}$  miles in length and 1,377 feet high at its south end. Angtong passage, between, has a depth of about 4 fathoms, and is the best channel between the inner group of islands.

\*Lat.  $9^{\circ} 46' N.$   
 Long.  $99^{\circ} 40' E.$     **Koh Wau\*** and **Koh Laan**, 327 and 190 feet high respectively, are the northernmost of the group, with Castle islets southward of the former. Between these islets and Koh Lim 675 feet high, standing just outside the 5-fathoms line, is North passage, 4 miles wide with a depth of about 10 fathoms. There are several high islets, and a chain of numerous rocks, above water, filling the space between Koh Lim and Koh Angtong, 3 miles southward.

**BANDON BIGHT** is nearly 15 miles wide between Lem Kung Mau and Lem Sie, but is very shallow, there being less than 3 fathoms for about 16 miles northward of the first-mentioned point. The banks are reported to be constantly changing and decreasing in depth.

\*Lat.  $9^{\circ} 13\frac{1}{4}' N.$   
 Long.  $99^{\circ} 25' E.$     **Anchorage**.—The eastern part of the bight, wherein lies Koh Prap,\* a small island, 255 feet high, has a depth of about 9 feet. Small craft anchor about 2 miles north-east of the island, in that depth, 7 miles from the entrance to Bandon river.

Nearly all the western part of the bight has less than 6 feet water, and is covered with fishing stakes. There is a pool with 5 fathoms, close north-westward of a conspicuous sand bank, at 2 miles south-east of Pumreang, but there is only about  $1\frac{1}{2}$  fathoms at low water in the approach, which is from the north-eastward. There is a depth of 10 feet at high water over the flats to Chiya river, and about 15 feet inside the river entrance.

Trading vessels of or above 12 feet draught formerly used the anchorage 5 miles northward of Lem Sie, where there are depths of about  $3\frac{1}{2}$  fathoms; this is considered to be the best anchorage for steamers and other vessels loading or having communication with Chiya, Pumreang, and Bandon.

Lat.  $9^{\circ} 22\frac{1}{4}' N.$   
 Long.  $99^{\circ} 20' E.$     **A sand bank**, nearly dry at low water, lies from 2 to 3 miles eastward of Lem Sie; it should be given a wide berth.

**Bandon river** is accessible to vessels of about 6 feet draught, and it divides into two main branches above the town which is about 4 miles within the entrance; the eastern branch takes its rise in the mountains near Trang, where it is stated the watershed is so low that a boat can be

taken across with a very short portage to the upper waters of the Trang, Chart, 989 [2,685]  
Var. 11° E. the total distance to Trang (Malacca strait) being about 170 miles.

The population of the province of Bandon in 1896 was about 20,000, chiefly Chinese, engaged in exporting jungle produce such as rattans, skins, and horns ; quite a fleet of junks trade from here.

The province of Chiya or Chaiya lies northward of Bandon with a population of about 43,000, Siamese and Malays (no Chinamen). It suffers from a want of navigable streams as neither tin nor timber can be worked at a profit.

**Tides.**—For high water, full and change, in Bandon bight, see the chart, which gives a difference of several hours for various parts of this coast.

**COAST.**—From Lem Sie the coast trends northward to Sawi and Chunpon bays off which the bank fronting the shore extends about 3 miles in places ; it is advisable to keep seaward of the 10-fathoms line unless intending to visit any particular place.

**Loftus shoal**, consists of three patches, covering a space 2 miles in length, in a north-west and south-east direction, with 6 fathoms water on its seaward side ; it is marked dangerous, but a rock on the centre shoal is apparently above water ; it lies with Lem Bangman, bearing N. W.  $\frac{3}{4}$  W., distant 4 miles. A two-feet patch\* is charted 3½ miles S.S.E. of the rock \*Lat. 9° 44' N.  
Long. 99° 13' E. above water ; abreast the latter, but within the 3-fathoms line fronting the shore, are North and South patches, both said to be dry at low water.

**Langsuen road**, with a depth of about 5 fathoms, is situated 3 miles off the river and village of that name ; the river is barred, but has a depth of about 6 feet at high water ; in the rainy season the stream runs out at the rate of about 4 knots. Patches with less than 6 feet lie 1½ miles off its entrance.

East patch, awash at low water, lies on the south side of the road with the mouth of the river W.  $\frac{3}{4}$  N. distant about 3 miles ; there is another patch between it and the shore bank.

The district of Langsuen has a population of about 16,000 ; the chief resides about four hours pull up the river. The principal produce of the neighbourhood is fruit ; about 40 tons of tin are produced annually, and fishing is carried on to a considerable extent.

**Koh Petak** is an islet 425 feet in height, half a mile off Lem Tong Lat. 10° 3' N.  
Long. 99° 10' E. Woh, 6 miles northward of Langsuen ; a ledge of sunken rocks, with one of them above water, extends one mile seaward of it.

The bay northward of Koh Petak is guarded by the islets Ranpahtat, Kang Sueh, and Koh Mate Yie, within which vessels should not venture ; these are good objects to use for fixing the position of a vessel in this locality.

Chart 289 [2,685]. **Koh Mukapau**, the southernmost, is 570 feet in height and nearly 2 miles in length; it is surrounded by reefs.  
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The bay northward of Koh Petak is guarded by the islets Ranpahtat, Kang Sueh, and Koh Mate Yie, within which vessels should not venture ; these are good objects to use for fixing the position of a vessel in this locality.

Charts, 989  
[2,685],  
2,719 [2,686].  
Var. 11° E.

**Sawi bay**, 6 miles wide, is shallow nearly out to its entrance points. It is fronted by islets, namely, Kulah, Yung, Klap, Tang Lang, and Katu; vessels of light draught only can use the bay.

Lat. 10° 29' N.  
Long. 99° 14' E.

**CHUMPON BAY**, northward of Sawi bay, has the islets of Mat Kra, Pau Kleuh, Teluh, Nam, Tah Kai, and Samet in its approach; the easternmost is Koh Nam, 380 feet in height; those without the 10-fathoms contour-line have apparently deep water between them. Koh Samet, 320 feet high, is within the 3-fathoms line which fronts Chumpon bay.

The bay is about 2 miles wide between the rocky patch off its north point and Koh Samet, and affords anchorage in 4 to 5 fathoms during the south-west monsoon period, at 2 miles off the mouth of the river.

Under Koh Samet there is shelter for small craft in the north-east monsoon.

**Chumpon river** has a depth of 8 feet on its bar at high water. About 20 miles up is the town of Chumpon, near the centre of the Malay peninsula, which is here about 48 miles across.

**Canal.**—It was proposed a few years ago to construct a canal 22 miles in length, from Chumpon to the Kraw, a branch of the Pakchan, by which means a saving of several days might be effected by vessels bound to China from India, &c.; the project has apparently fallen through.

**Tides.**—It is high water, full and change, at Chumpon bay, at 6 h. 40 m., with a rise of about 4 feet.

**COAST.—Lem Tane** is a peninsula projecting 1½ miles southward of the coast line on either side of it, at 12 miles northward of Chumpon bay. At its extreme is a hill with a red cliff. Within the peninsula is a bay with a depth of about 2 fathoms, which affords shelter to trading craft off the village of Bang San. Koh Kye, 362 feet in height, lies 3 miles north-east of Lem Tane.

\*Lat. 10° 54' N.  
Long. 99° 30' E.

**Lem Chong P'ra**, is a remarkable craggy headland of 1,060 feet elevation.\* Koh Buot, a narrow island, 900 feet high, lies south-westward of the cape, within which is a snug bay named Chong P'ra. There are four islets or rocks south-eastward of Koh Buot, the two outer of which are 100 feet high, one mile apart, and distant about 5 miles from the shore.

**Lem Tong Lan** lies 18 miles northward of Chong P'ra. About midway within the bay formed by these points, is Koh Tlu, a level cliffy island, 342 feet high, and nearly 1½ miles in length. Within and south-westward of this island are two rocky islets named Chang and Sing, surrounded by reefs. There is no clear passage for vessels between Sing and Koh Tlu. Excepting the foul ground about Koh Tlu, the bay is safe.

Lem Tong Lan is 814 feet high, and the coast being very low within, at a distance it makes like an island. At 11 miles northward of Lem Tong Lan, there is a cluster of conical hills, with a low island surrounded by a reef, at the distance of a quarter of a mile from the shore.

Koh Chan, an island 80 feet high, with depths of 7 to 8 fathoms around it, is situated 4 miles off the coast, and about 17 miles north-eastward of the conical hills just mentioned.

Kau Luang, a mountain 4,326 feet in height, which is by far the most conspicuous landmark in this neighbourhood, lies abreast Koh Chan at about 7 miles within the coast.

**Koh Luem**, 406 feet high, is the outermost of several islands which lie off the bays named Ao ti nau and Ao ti bon lai. The middle and southern peninsulas forming these bays have each a remarkable rocky horn 794 and 907 feet high, respectively.

Ao ti bon lai, the northern bay, affords the best anchorage. The mountain Kau Maun lies 8 miles within, over the ridge of which is a pass 750 feet above the sea.

**Koh Ta kut**, 300 feet high, situated about 28 miles north-north-eastward of Koh Luem, is a narrow island one mile in length; the coast between these islands is clear of danger, and the depths regular outside the 3-fathoms line, which about midway extends 2 miles from the shore. Koh Num sau, 500 feet high, lies 2 miles north-north-west of Ta kut, with rocks near the shore between.

**LANDMARK.—Samroiyot hills.**—Sui point, situated about half a mile south of Koh Ta kut, is the end of a spur extending from a remarkable clump of rocky mountains near the coast, named Samroiyot, or Three Hundred peaks, and ranging from 1,813 to 1,900 feet in height. At a distance their appearance is that of a serrated table island.

Samroiyot is unlike any other land in the gulf, and sailing vessels bound to Bangkok in the south-west monsoon should make it.

**Water.**—The only fresh water to be obtained between Chong P'ra and Sui point is from wells, which have been provided at places convenient for the use of native craft, by wealthy benevolent Siamese.

**COAST.**—The coast takes a northerly direction from Koh Ta kut, and for about 10 miles the 3-fathoms line is from 2 to 3 miles off shore.

**A rocky patch** of  $1\frac{1}{4}$  fathoms lies within the edge of this line,  $1\frac{1}{4}$  miles off shore, with Koh Ta kut bearing S.  $\frac{1}{4}$  E., distant  $8\frac{1}{3}$  miles; it is steep-to and should be given a wide berth.

**Pran rocks**, two in number, each about 100 feet high, and three-quarters of a mile apart, lie 17 miles northward from Koh Ta kut, about

Chart, 2,720  
[2,687].  
Var. 1 $\frac{1}{2}$  $^{\circ}$  E.

a mile from the coast. The village of Pran is situated at the entrance of the river of the same name, 4 miles southward of these rocks.

**Sunken rock.**—A small headland stands out prominently from the coast line at 2 miles northward of Pran rocks; East, distant three-quarters of a mile from it, is a rock which dries at half ebb.

Lat. 13° 1 $\frac{1}{2}$ ' N.  
Long. 100° 3' E.

**CHULAI POINT.**—From the headland just mentioned, the coast trends northward about 31 miles to Chulai point and is low. A few miles within is the Triple peak range 2,100 feet in height, with Chulai peak 1,200 feet in height nearer the coast. Near the middle of this coast there is much rocky ground, and some patches of 2 to 3 fathoms lie from 3 to 5 miles off shore; from the outer patch of those charted, Chulai peak bears N.W. by W.  $\frac{3}{4}$  W., distant about 8 miles.

**Caution.**—Other patches may exist where no soundings are shown; vessels, therefore, should give this coast a wide berth and not stand into less than 10 fathoms.

**The COAST** about Chulai point and to the northward of it is all very low. The edge of the bank extends from 2 to 3 miles off the shore and is steep-to, especially off the village of Banlam.

Within Banlam point the low coast trends north-westward, forming a bay towards which the depths decrease regularly, from whence along the head of the gulf to the bar of Bangkok river the lead will be found a safe guide by day or night.

Lat. 13° 6' N.  
Long. 99° 55' E.

**Pechaburi town** is 8 miles up the river of the same name, the principal entrance to which is 5 miles north-west of Banlam point. It is clean, well-built, densely populated, and the centre of a great rice-producing district. In point of climate it is preferable to Bangkok, and more likely to agree with Europeans. The anchorage off the entrance of the river is far more sheltered in the south-west monsoon than that off the bar of Bangkok river, and cargo might be safely embarked at all times.

Lat. 13° 28' N.  
Long. 100° 14' E.

**Tachin river**, situated about 20 miles westward of Bangkok river, was navigated by H.M.S. *Teazer*, of about 11 feet draught, in November 1871, as far as Nakonchisi, about 25 miles from the mouth. The bar extends from 3 to 4 miles off with about 3 feet on it at low water springs; the river deepens to 2 fathoms within, abreast the entrance points, and above to 3 and 6 fathoms. The entrance is difficult to distinguish, the land in the neighbourhood being low, and covered with trees. It may however, be safely approached by the lead; some 3-fathoms patches lie between the 3 and 5 fathoms lines off the entrance. For the shore of the gulf eastward, see Bangkok river, page 390.

EAST AND NORTHERN SHORES OF THE GULF, WITH  
OFF-LYING ISLANDS AND DANGERS.

**PULO OBI**, the principal island of the Obi group, lies about 11 miles S. E. by S., of Cambodia or Kamáo point. The island is  $2\frac{1}{4}$  miles in length and about 950 feet in height at its south end. A bank with from about 3 to  $4\frac{1}{2}$  fathoms, mud, extends 2 miles north-west and with from  $2\frac{1}{2}$  to 5 fathoms, rock,  $1\frac{1}{2}$  miles south-east of Pulo Obi. An islet, 541 feet in height, lies a mile south-east of the south end of Pulo Obi, with a rock or islet east of it. Hull rock, 32 feet in height, lies 4 miles south-eastward of Pulo Obi, with depths of 14 to 15 fathoms between it and the islets mentioned.

The channel between Pulo Obi and the depth of 3 fathoms on the edge of the bank extending from the coast of Cambodia is about  $1\frac{1}{2}$  miles wide; the chart shows about 7 fathoms water, with patches of 4 and 5 fathoms. This passage is not recommended until it has been more fully examined.

Marsh reef, situated about one mile within the edge of the shore bank, and N.  $\frac{1}{4}$  W.  $3\frac{1}{2}$  miles from the north point of Pulo Obi, is a group of rocks awash at low water.

H.M.S. *Britomart*, passing outside Pulo Obi, December 1902, reported depths of 5 to  $5\frac{1}{2}$  fathoms being obtained when W. by N. 6 miles from the island, which soundings were maintained until the vessel was about a mile from its south point. These soundings cannot be implicitly relied on as the ship was proceeding at a speed of 9 knots.

**LIGHT**.—On the eastern summit at the south end of Pulo Obi, from a square light-grey granite tower, about 49 feet high, elevated 984 feet above high water, a *white flashing* light is exhibited showing *one* short flash every *five seconds*, visible in clear weather from a distance of 40 miles. Within a distance of 8 miles from the island the light is obscured by the land between the bearings of N.  $39^{\circ}$  E., and N.  $53^{\circ}$  E.; as the light is approached this obscured arc increases.

**Anchorage**.—There are two small bays, one on the north-west, the other on the east side of Pulo Obi. The best anchorage for small craft is directly off them, on either side of the island, according to the monsoon, at about half a mile from the shore. Larger vessels must anchor farther off. The depths near the anchorages were reported (April 1904) to have one fathom less water than those shown on plan.

**Water**.—Fresh water is plentiful in these bays, but the shores are not convenient for embarking it; the islands are densely wooded.

**Royalist bank**, on which depths of 6 to 10 fathoms were found when crossing it for a distance of  $1\frac{1}{2}$  miles, and depths of 17 fathoms at each end, lies about 26 miles S.E. by E.  $\frac{1}{4}$  E. from Pulo Obi; less water

Lat.  $8^{\circ} 25' N.$   
Long.  $104^{\circ} 48' E.$

Charts. 2,723

[2,693].

2,101 [2,692].

2,722 [2,691].

Var. 2° E.

Lat. 8° 38' N.

Long. 104° 42' E.

may exist. Another bank of 6 fathoms is charted E. by N.  $\frac{1}{2}$  N., 20 miles from Royalist bank.

**CAMBODIA, or KAMÁO POINT,** the south-western extreme of Cambodia, is low and covered with trees. The edge of the bank off the point is very steep-to, the depths decreasing suddenly from 8 to 2 fathoms, which latter depth will be found at the distance of  $2\frac{1}{2}$  miles off shore.

Abreast Pulo Obi the edge of the bank is fully 5 miles off shore, and is steep-to; farther eastward it extends about 7 miles off and is not so steep. There are numerous fishing stakes on the bank. As several rocks have been found within the 5-fathoms line, it will be prudent not to go into less than 8 fathoms water.

From Kamáo point eastward the bank is reported (1904) to have extended to the southward, a sounding of  $2\frac{1}{2}$  fathoms having been obtained in a position from which Kamáo point bears N. 8° W, distant  $6\frac{1}{4}$  miles, and Pulo Obi lighthouse S. 57° E. The coast in this neighbourhood should be given a wide berth until it has been examined.

To the northward of Kamáo point the depths are regular, and the coast may be approached by the lead.

**Kamáo river.**—From Cambodia point the land trends in a N.E. by E.  $\frac{1}{2}$  E. direction 17 miles to Kamáo river entrance, which is fronted by a bar to the distance of about 5 miles, nearly dry at low water.

**The Coast** from Kamáo river trends in a northerly direction 53 miles to abreast the Pulo Dama group, the land between being all low, with the exception of the Paps, two small rocky bluffs, 100 feet in height, on the coast.

Lat. 8° 57' N.

Long. 104° 31' E.

**False Pulo Obi**, 23 miles N.N.W.  $\frac{5}{8}$  W. of Cambodia point, is three-quarters of a mile in length, half a mile in breadth, and 500 feet in height, with cliffy sides, and steep-to all round. At 4 miles south-southeastward from False Pulo Obi is a small rocky island, 167 feet in height, with a ledge of rocks projecting a quarter of a mile from its east side. The channel between these two islands has a depth of 11 to 14 fathoms, and between them and the coast are depths of 6 to 9 fathoms.

Lat. 8° 18' N.  
Long. 103° 28' E.

**OFF-LYING ISLANDS AND DANGERS.—Pulo Panjang**, the main island of the Panjang group, is 3 miles in length, east and west, 2 miles in breadth, and of a nearly uniform height of 550 feet, making like table-land from every direction. There are two islets 100 and 200 feet in height at about a mile from its east end, with deep water between. Peak islet is connected to the south point of Panjang by a ridge of rocks, with 6 feet water on it. White rock, 75 feet high, lies S. by W.  $1\frac{1}{2}$  miles from its south point; and two large rocks, East island and Table rock, elevated 110 and 40 feet, respectively, lie N.E. by E.  $8\frac{1}{2}$  miles from Panjang.

**Anchorage.**—During the north-east monsoon, the bay on the south-west side of Panjang affords shelter and good anchorage. A rock, 2 feet, [2,693], high, lies S.W. about 6 cables from West point. Fresh water and wood can be obtained, and fish may be caught with a seine. The anchorage on the south-east side of the island is indifferent.

**Rajanattianuhar reef,** on which the British steam-vessel of that name became a wreck, consists of two heads of rock, with 4 feet water, surrounded at the distance of a cable by a fringe of coral, with depths of 2 to 5 fathoms, and steep-to. The centre of the reef lies with White rock bearing S.W. by W.  $\frac{3}{4}$  W., and Peak island N.N.W., distant 7 cables.

**Dewagougse shoal.**—The master of the steam-vessel *Dewagougse*, Lat.  $9^{\circ} 35' N.$  Long.  $103^{\circ} 21' E$  1888, reported the existence of a shoal with a depth of 3 fathoms, on which that vessel struck, situated with Pulo Panjang bearing about S.S.E. distant 17 miles. (See chart No. 2,414.)

**Caution.**—Pulo Wai or Koh Kwang Noi, Veer islet, Koh Prins, the Tankwala group, and Depond reef, have been surveyed; and the soundings taken in the neighbourhood seem to denote that the passages between them are safe; but as time would not permit the approaches from the northward and westward to be sounded, caution must be observed when steering for them from those quarters.

The channel between these islands and Koh Tron is believed to be safe.

**PULO WAI,** or Koh Kwang Noi, about 50 miles north-west of Pulo Panjang, consists of two islands from 200 to 300 feet high, each being nearly 2 miles in length, from a quarter to three-quarters of a mile in breadth, and fringed by reef in places. They are distant nearly a mile from each other, and the channel between them has depths of above 10 fathoms in the fairway.\* A rock, 3 feet high, lies E. by S. three-quarters of a mile from the east point of the eastern island, and a patch of  $4\frac{1}{2}$  fathoms lies S.S.E.,  $2\frac{1}{2}$  miles from the same point. Saracen rock, with 4 feet water, lies N. by W.  $\frac{1}{4}$  W. three-quarters of a mile from the north-west end of the eastern island.

**Anchorage.**—Good anchorage will be found off the north side of the eastern island, but the best berth is off a sandy bay on the north-east side of the western island, in a depth of 8 fathoms, at a quarter of a mile from the shore.

**Water.**—The natives obtain their water from wells about the middle of the eastern island. The islands are wooded; the beaches afford turtle; and a cast of the seine will generally procure fish.

**Depond reef,** only half a cable in diameter, is awash at low water, Lat.  $9^{\circ} 58' N.$  Long.  $103^{\circ} 6' E$ . steep-to on all sides, and in fine weather might not be noticed until close

General chart, 2,414 [2,682].

Charts, 2,722  
[2,691].  
2,721 [2,690].  
Var.  $2^{\circ}$  E.

upon it. From the reef, the peak at the south end of the western Pulo Wai is visible over the middle of the eastern Pulo Wai bearing W. by S.  $\frac{1}{2}$  S., distant 14 miles.

**Koh Tang**, or Tankwala island, bearing N.N.E.  $\frac{1}{2}$  E., 23½ miles, from Pulo Wai, is 3½ miles in length, narrow, and 440 feet in height near its north end. The sandy bay on its eastern side will afford good anchorage in the south-west monsoon; and Shelter islet, lying in the middle of the bay, would afford some shelter to a small vessel anchoring here in the north-east monsoon. Within this islet will be found a depth of 7 fathoms.

At one mile south-east of Koh Tang is a small islet, and at 4½ miles E.S.E. are two islets, 106 and 141 feet in height, with depths of 15 to 17 fathoms between. Patches of 3¾ and 4¾ fathoms lie respectively about three-quarters and 1½ miles, south-south-east of the south-easternmost islet.

**Veer islet**, 120 feet in height, lies nearly 15 miles W.  $\frac{1}{2}$  S. from the south end of Koh Tang, with depths of from 10 to 20 fathoms around it.

**Koh Prins**, 200 feet in height, lies about 9 miles W. by N.  $\frac{1}{2}$  N. of the north end of Koh Tang, and is about one mile in length; an islet, 150 feet in height, lies half a mile W.S.W. of it, and one, 20 feet high, lies W. by S. of the latter.

**REPORTED SHOALS.**—In lat. 10° 41' N., and long. 102° 51' E., a depth of 9 fathoms, has been obtained and a reef has been reported to exist with 15 to 20 fathoms close around.

Lat. 10° 48' N.  
Long. 102° 53' E.

**Condor reef**, on which the Bremen barque *Condor* was lost in 1860, was reported to be in lat. 10° 42' N., long. 102° 48' E. In 1872 it was examined by Lieut. Veron of the French navy, and found to be a rocky plateau half a cable in extent, with general depths of 16 to 20 feet, and several spots of one to 6 feet; it is fairly steep-to, especially on the west side. From this examination the shoalest part was placed in the position given in the margin; it might possibly be a mile or so farther west.

**Jan Peter reef.**—In 1880 the *Jan Peter* grounded on a reef with 2 fathoms water, and by bearings was placed in lat. 10° 46' N., long. 102° 42' E., or close to the position given by Mr. Ellis in 1860, who saw a wreck there. It is however, possible, that this reef may be identical with Condor reef.

Lat. 11° 26' N.  
Long. 1° 12' E.

**Simpson shoal**, reported in 1886 to be in the position noted, is stated to have been plainly seen, but that before the lead could be got ready the vessel had passed over it; a sounding of 18 fathoms was then obtained. Its existence is extremely doubtful.

General chart, 2,414 [2,682].

**Koik rock.**—From information received, communicated by Captain Charts. 2,723 [2,693], A. J. Loftus of the Siamese Government, there is every reason to believe 2,725 [2,694]. that a sunken rock exists about 83 miles north-east of Koh Tau, in the Long. 101° 3' E. fairway of the northern part of the gulf of Siam :— Var. 2° E.

This rock (Koik rock), originally reported by the master of the Norwegian barque *Koik* in 1882, was stated to be about 12 yards in length in a north and south direction, with about 6 feet water on it. The position reported must be considered doubtful.

Two reefs were reported in 1889 in this neighbourhood, namely in lat. 10° 45' N., long. 101° 1' E., and in lat. 10° 45' N., long. 100° 56' E.; they are probably all one and the same reef.

**PULO DAMA GROUP.**—Hon Nam Du, the principal island, Plan on 2,723 [2,693]. situated 43 miles north-north-westward from False Pulo Obi, is 3½ miles in length, north and south, and one mile in breadth, having near its centre a sharp peak, 1,015 feet in height. Several islands lie off its north point, and off its eastern side. The northernmost, Hon Gian, is 345 feet in height, and the eastern islands are about the same.

Aspic rock, with 2 feet water, lies 3 cables N. 24° E. from the north-west extreme of Hon Truok, with depths of 5 to 15 fathoms between. Another rock, awash at low water, lies 1½ cables N.W. of Aspic rock.

There is a rock awash, at a quarter of a mile west of the islet (157 feet high) situated W.S.W. one mile from Hon Gian.

**Anchorages.**—During the south-west monsoon, the best anchorage is in about 5 fathoms east of the highest peak, with Hon Nhom in line with Hon Gian to the northward; the holding ground is good, but squalls of wind come off the high land.

There are two patches of 3 fathoms 6 cables apart, north and south, eastward of the anchorage marks mentioned, for which see the plan.

During the north-east monsoon, there is anchorage in about 7 fathoms south-west of Hon Mau, the south-easternmost islet; also under the west coast of Hon Nam Du at the entrance of a small bay, situated abreast the south point of Hon Kolon. There is, however, a rock with 2½ fathoms of water over it in the middle of the latter bay.

**Donai shoal.**—The master of the French s.s. *Donai* reported in Lat. 9° 57' N. Long. 104° 19' E. 1898 that his vessel when northward of Pulo Dama group and about 9½ miles south-westward of Tree rock, appeared to take the ground, but without stopping her way. An examination of the spot, however, showed a uniform depth of 4½ fathoms, sand. This shoal, charted as per margin, must be considered doubtful.

**TAMMASSU** is a table-topped island, 1,390 feet in height, with Lat. 9° 47' N. Long. 104° 30' E. steep cliffy sides, situated 16 miles east-north-eastward from Pulo Dama, with depths of 5 to 6 fathoms apparently around it. Fresh water was found in small quantities.

Charts, 2,723  
[2,683],  
2,725 [2,624].  
Var. 2° E.

A pinnacle rock, with a depth of 5 feet over it lies  $3\frac{1}{2}$  cables N.W. by W.  $\frac{1}{2}$  W., from the west point of Tammassu; vessels should not pass between this rock and the rocky ledge, almost covered at high water, extending about a cable from the point.

**Teksu island**, 13 miles north-eastward of Tammassu, is of conical form, and 1,380 feet in height. The island lies near the edge of the mud flat, which fronts the mouth of the Kieng Kiang or Gia river for a distance of about 15 miles. The river is accessible only to light trading craft. Rach Gia, the town on it, is of some commercial importance.

**Teksia peak** is a cone, 800 feet in height, on the north side of approach to Keing Kiang river, and remarkable as the first high land on the mainland seen on approaching from the southward. Within this peak there is an anchorage for large trading junks; their cargoes are brought out from the river in the flat boats of the country.

**TABLE HEAD** is a rocky headland, 600 feet in height, 15 miles westward of Teksia peak. The coast between forms a shallow sandy bay, having several streams falling into it. A rock awash, with about 4 fathoms around, lies S.E.  $\frac{1}{2}$  S.,  $4\frac{1}{4}$  miles from Table head. Just within Table head are some rocky hills attaining an elevation of 726 feet.

**Bulua islands.—Tekere or Minghue**, a cone-shaped island, 1,120 feet in height,\* 8 miles from Table head, is the largest of the Bulua islands, an archipelago of islands and rocks that extend westward and south-westward from Table head. The outermost islets are: Outer island, lying S.W. 4 miles from Tekere; Shark island, W.  $\frac{1}{2}$  S.  $4\frac{1}{4}$  miles; Tree rock, W.N.W.  $4\frac{1}{2}$  miles; and Saddle rock, N.W. by W.  $\frac{1}{2}$  W. 5 miles from it. At 2 miles N.W. by N. from Shark island, and the same distance S.W. by S. from Saddle rock, a rock with less than 6 feet water is charted. West island, lying N.W.  $\frac{1}{2}$  W., 11 miles from Tekere, about midway between that island and Pulo Sisi or the Twins, is the north-westernmost of the group. A 3-fathoms shoal lies S.S.W.  $2\frac{1}{2}$  miles from West island.

**Caution.**—Numerous other dangers and islets exist in this neighbourhood, not shown on the chart; the locality has not been properly surveyed, and vessels near these islands should navigate with caution.

Lat. 10° 21' N.  
Long. 104° 32' E.

**HATIEN or KANKAO RIVER**, situated about 16 miles north-westward of Table head, is only accessible to craft of very light draught, there being only about 6 feet on the bar at low water. The bar extends  $1\frac{1}{2}$  miles seaward of the town, and the depths are not above 3 fathoms at 5 miles off, so that only vessels of light draught can approach the bar. On either side of its entrance are bluffs from 300 to 600 feet high, which, together with the gap dividing them, are remarkable from the westward. From this direction the town of Hatien, situated at the entrance,

within which is a lake some  $2\frac{1}{2}$  miles in length, nearly filled with mud, may be seen at the distance of 6 or 7 miles.

This river communicates by the Hatien canal with Hau kiang, a branch of the Mekong above the citadel of Chaudok, and has depths of 4 to 10 feet.

**LIGHTS.**—**Nui Nai.**—On Loctri point, Hatien bay, from a masonry tower over dwelling, 30 feet high, at an elevation of 205 feet above high water, a *flashing white* light is exhibited giving a short flash every *five seconds*, visible in clear weather at a distance of 21 miles, when bearing N.  $32^{\circ}$  W., through north and east, to S.  $75^{\circ}$  E.

**Leading lights.**—From a small masonry structure on the pier end at the west entrance point to the Hatien river, a *fixed red* light is exhibited.

At  $5\frac{2}{3}$  cables N.  $41^{\circ}$  E. from the preceding a *fixed white* light is shown, at an elevation of 33 feet above high water. These lights in line lead between the banks into the river.

**Beacons.**—The channel to the river, about three-quarters of a cable in width, is marked by wooden beacons, the approach lying southward of the outermost, 26 feet high and surmounted with a spherical top-mark. The inner beacons, ten in number, are plain stakes, and mark the banks on either side.

**Tides.**—The time at which it is high water, and the amount of the rise of tide in this part of the gulf of Siam, is reported by local navigators to be very irregular and variable, except during the period of the north-east monsoon.

**Coast.**—Between Kankao and Kep point, 11 miles to the north-westward, the coast is only navigable for craft of very light draught.

**PIRATE ISLANDS.**—This group extends for a distance of about 13 miles southward of Kep point, and lies in the approach to Kankao river.

Peaked island, the northernmost, is 504 feet in height and lies about  $2\frac{1}{2}$  miles off Kep point; good water and wood are plentiful here.

South Pirate, the southernmost, is very small and surrounded by a reef which extends to the distance of about half a mile on its north side. Great Pirate island lies 4 miles north-north-east of it.

Rugged rock, 6 feet high, at  $2\frac{1}{2}$  miles north-west of Great Pirate is the west extreme of the group. Within the 3-fathoms contour encircling this group are numerous shallow patches of which the chart will afford the best information. The passage between them and the shore is only adapted to coasting craft with local knowledge.

**Anchorages.**—There is anchorage during the south-west monsoon period for small craft, in about  $3\frac{1}{2}$  fathoms, about half a mile off the east end of Great Pirate island; also at 2 miles eastward of North Pirate in

Charts, 2,725  
[2,694]  
2,723 [2,693]  
Var.  $2^{\circ}$  E.

Lat.  $10^{\circ} 21' N.$   
Long.  $104^{\circ} 25\frac{1}{4}' E.$

Charts, 2,725  
[2,694],  
2,728 [2,693].  
Var. 2° E.

about 4 fathoms. In the north-east monsoon, there is anchorage in 3 fathoms under the south side of Peaked island. The latter is stated to be the best in the north-east monsoon for vessels that have sometimes to receive cargo both from Kamput and Kankao. The navigator must use his own discretion when proceeding to any of these anchorages.

For the latter the best channel apparently is that westward of the Pirate group.

**Shoals.**—Between Peaked and Temple islands there is a rocky plateau, on which the general depth is  $1\frac{1}{2}$  fathoms, but there is a small patch of 6 feet upon it lying N. 83° E. from the summit of Temple islet. There is a pinnacle rock named Brandon, situated S.E.  $3\frac{1}{2}$  miles from Temple islet, with 3 feet water over it, and another shoal with only 2 feet at  $8\frac{1}{2}$  cables S. 38° W. from the same islet.

Lat. 10° 28' N.  
Long. 104° 10' E.

**KAMPUT APPROACH.**—Rocky islet, 26 feet in height, lies about 6 miles west of Kep point, within the 3-fathoms edge of the bank extending southward about 21 miles from Bumbi bluff and embracing Pulo Sisi. Temple island lies about  $1\frac{1}{2}$  miles E. by S. of it.

**Pulo Sisi** or the twins, are two islets covered with trees and connected by a reef of rocks at the south extreme of the bank just mentioned; the northern islet is 213 feet high and lies about S.W. by W. 5 miles from the South Pirate.

Lat. 10° 18' N.  
Long. 104° 10' E.

**Rosita rock**, on the same bank, lies N.W. by N.,  $4\frac{1}{4}$  miles from Pulo Sisi. It is half a cable in extent, with 2 feet water on it and steep-to, and may at times be seen from aloft by the discoloured water. Bumbi cone in line with east side of Bumbi bluff, bearing N.  $\frac{1}{4}$  W., leads westward of Rosita rock in not less than  $2\frac{1}{2}$  fathoms water. The islands and dangers mentioned form the east side of the approach to Kamput from the southward.

\*Lat. 9° 40' N.  
Long. 104° 14' E.

**The Brothers.**—East and West Brothers\* are two islets 3 miles apart, and 473 and 406 feet respectively in height, lying off the south point of Koh Tron. There are three rocks southward and westward of the West Brother; the south-western and largest is Table rock, distant one mile and about 20 feet high; the south-easternmost, at about the same distance, is 5 feet high, and the other, 3 feet high, is distant about 2 cables. They are all apparently steep-to.

**Koh Tron**, called by the natives Koh Dud, and by the French Fu Kok, forms the west side of approach to Kamput. It is of a triangular shape, 26 miles in length, north and south, and 14 miles in breadth near the north end. The north-east side of Koh Tron is composed of table-land about 8 miles in length, and 2,030 feet in height at its north end, southward of which table-land is a quoin-shaped hill 1,968 feet in height; and at the

south end of the island there are some conical hills and bluffs. Gunong Kwala at the north extreme is 1,220 feet in height.\* There are also some hills of moderate height near the north-west point; the remainder of the island is low.

The eastern shore is fringed with reefs and sunken rocks to the distance of from 3 to 4 miles, and the north side to one mile in places. The west side is almost clear; Spread Tree islet, with rocks outside it, lies nearly a mile from the shore at about 3 miles south of the north-west point.

There are several villages, the chief of which Duong Dong is on the Kua Giang, a stream on the western side of the island; the village of Retram is situated on a stream westward of the north point. There are several fresh water streams on the island.

A group of islands extends about 7 miles southward of Koh Tron, the highest being 429 feet in height. Omega is the south-westernmost of these, and from it a reef projects southward for half a mile. There are channels with apparently deep water between them, but they should not be used as dangers exist other than those shown on the charts. The passage between these islands and the Brothers is 5 miles wide, with depths of 9 to 15 fathoms.

**South channel to Kamput.—Directions.**—The Brothers, Lat. 9° 48' N.  
Long. 104° 10' E. with Pulo Dama, form the limits of the southern approach to Kamput; farther northward Pulo Sisi and Rosita rock form the eastern side of the channel, and the shallow water extending some  $3\frac{1}{2}$  miles off Koh Tron the western. The channel is not recommended for vessels above 15 feet draught. Vessels may, if necessary, pass northward of the Brothers, but they should not approach Round Hill point (the south-east point of Koh Tron) nearer than 5 miles, as a rocky ridge with 2 fathoms on it extends E.S.E.  $2\frac{1}{2}$  miles from the point, with shallow water beyond.

Bearings of the Pulo Dama islands, the Brothers, Pulo Sisi, and of the conspicuous peaks of Koh Tron, should suffice to keep a vessel westward of the doubtful Donai shoal and of Rosita rock. Gunong Susu, bearing North, leads westward of Rosita rock; it will probably be visible when approaching the rock. From aloft, in clear weather, Bumbi cone in line with the east extreme of Gunong Susu, bearing N.  $\frac{1}{4}$  W., also leads westward in about  $2\frac{3}{4}$  fathoms; this leading mark will also lead to the anchorage in  $3\frac{1}{2}$  fathoms,  $1\frac{1}{2}$  miles southward of Bumbi bluff, or anchorage may be taken abreast and westward of Rocky and Temple islands in a little deeper water.

Sailing vessels working in must be guided by the lead and the chart, observing that the water shoals suddenly on the edge of the reef extending from the shore south-east of the summit of Koh Tron.

General chart, 2,414 [2,682].

Charts, 2,725  
[2,694].  
2,723 [2,693].  
Lat.  $10^{\circ} 23' N.$   
Long.  $103^{\circ} 47' E.$   
Var.  $2^{\circ}$  E.

**NORTH CHANNEL TO KAMPUT.**—For vessels above 15 feet draught, the channel northward of Koh Tron should be taken, as the depths are not less than 6 or 7 fathoms throughout, whereas the channel eastward of Koh Tron is shallow. Vessels of or above moderate draught cannot approach within 7 miles of Kamput.

**Islands and dangers.**—Tian Moi or Water island is a good mark by which to recognise the entrance of the North channel. This island is 713 feet in height at its northern end, and has some fishermen's huts on the south side. The bay on the north shore within Water island and the coast near Kamput, is fronted by a shallow flat to the distance of 5 miles; further eastward between these points it is reduced to one or two miles.

Middle island lies between Water island and the mainland; it has two peaks, the northern one being 575 feet in height. A small rocky patch with a depth of 5 feet lies 7 cables S.  $14^{\circ}$  W. from the south point of Middle island.

The entrance of the North channel between Water island and Koh Tron is  $2\frac{1}{2}$  miles wide, with Flat rock just within it, situated North two-thirds of a mile from the north-west point of Koh Tron; a rock, which dries, lies mid-way between Flat rock and the point. Clump island 60 feet high, covered with trees, lies S.W. by W. 2 miles from the same point, with a patch of 3 feet at 4 cables E.  $\frac{1}{2}$  N. of it. Channel island, 48 feet high, lies in the entrance, nearly a mile northward of Clump island.

Lat.  $10^{\circ} 20' N.$   
Long.  $103^{\circ} 49' E.$

**Cape Clear rock**, a pinnacle, with 4 feet water, lies with the east extreme of Water island bearing N.W.  $\frac{1}{2}$  W., distant a little over a mile, and the south extreme of the island W. by S.  $\frac{1}{2}$  S.

The ground is foul to the distance of half a mile off Kwala point, the north extreme of Koh Tron, and a number of rocks 20 feet high extend about 2 cables from the point, having others near them under water. There is a patch of  $1\frac{1}{2}$  fathoms on which the *Loire-Inferieure* grounded, situated N.  $\frac{1}{4}$  W. from Gunong Kwala, at  $1\frac{1}{2}$  miles off the point, with depths of 8 to 12 fathoms around.

**Directions.**—The fairway is close northward of Channel island and Flat rock, thence passing 2 miles or more northward of Kwala point to avoid the  $1\frac{1}{2}$ -fathoms patch off it. The channel eastward of Clump island and southward of Flat rock is not recommended, as the ground is foul between them and Koh Tron, and the set of the tidal streams irregular.

Caution should be used in standing towards the edge of the northern bank when approaching Kamput river, as it is steep-to and rocky.

**Anchorages.**—Large vessels cannot proceed more than 5 or 6 miles eastward of Kwala point or within about 7 miles of Kamput.

Vessels bound to Kamput, should haul south-eastward from abreast Kwala [Charts. 2,725  
point and keep it bearing northward of West until Bumbi cone is in line 2,694];  
with the east side of Gunong Susu, as when coming by the southern 2,723 [2,693];  
channel, which mark will lead to the anchorage, in 3½ fathoms, with  
Kep point hill bearing E. by S.

Good anchorage will be found on the north-west side of Water island in a depth of 4 fathoms, at a quarter of a mile from the shore; and all vessels intending to remain any length of time at Kamput would do well to anchor here and complete their water. The watering place is in a sandy bay on the north-west side of the island; it is a fine running stream, and as the beach is very steep, the water is easily embarked. This bay is also a good place to haul the seine. Care must be taken to avoid the 5-feet patch situated 7 cables S. 14° W. from the south point of Middle island.

**Town.**—The town of Kamput is situated about 3 miles up the western branch of the river, in the mouth of which is an island; the eastern branch, between the island and Gunong Susu is only available for canoes.

The western branch admits small trading junks, but they are sometimes detained in the river by want of water on the bar.

In this entrance is the Custom-house protected by a stockade.

The town consists of about 500 houses; the neighbourhood is thickly populated and there are numerous creeks intersecting it.

The governor resides at Bumbi 1½ miles from the town; here are stored rice and other products for trading purposes. The principal traders are Chinese who visit the place in junks which lie in the creeks near the town.

**Supplies.**—Bullocks, pigs, fowls, ducks, and eggs are obtainable at Kamput. Of vegetables there are a variety, and the market has a supply of fruit and fish. Wood is plentiful; water can be obtained from wells near the town, but it is muddy and bad, and procured with difficulty. See watering place, under anchorages, above.

**Tides.**—It is high water, full and change, at Rocky island off the entrance of Kamput river, at 4h. Om., springs rise about 4 feet. The streams here, as in most other parts of the gulf, run for 12 hours near the full and change, subject to great irregularities.

**Winds.**—During the months of March and April the winds are usually from S.E. with strong squalls from N.W. to E.N.E. at times. The temperature at that period is about 86°, sometime reaching 90°.

**COAST.—Bay island,** 380 feet high, situated 11 miles W. by N. ½ N. of Water island, is 2 miles in length by 1½ miles in breadth. Three small rocky islands lie westward of Bay island, and one eastward just within it.

Charts, 2,722  
[2,961]  
2,101 [2,692]  
Var. 2° E.

**RONG SAM LEM**, the southernmost of a chain of islands, is 5 miles in length, north and south, 780 feet in height at its north end, and wooded; its coasts are steep-to.

Lat.  $10^{\circ} 32' N.$   
Long.  $103^{\circ} 18' E.$

**Intended light** on the south end of Rong Sam Lem. The light will be *quick-flashing, red*, elevated 312 feet above high water, and visible at the distance of 24 miles in clear weather. *Lighthouse building.*

**Saracen bay**, on the east side of Rong Sam Lem, almost divides it into two parts, and affords good anchorage, the shores being high and the entrance fronting the mainland. The bay is 2 miles in length and one mile wide in the entrance, with depths of 5 to 6 fathoms over a considerable portion of it. The bottom is flat and generally sandy, decreasing in depth towards the shore. There are no dangers in the southern arm, at the head of which is a sandy beach, but the south side of the northern arm is encumbered with sunken rocks southward of the two rocks shown on the plan.

A patch of  $4\frac{1}{2}$  fathoms is charted  $1\frac{1}{2}$  miles east of the north point of the bay.

Wood and fresh water may be obtained at the head of the bay, but owing to the shallow water, it is difficult to embark. A more convenient watering place will be found just northward of the bay, where the beach is steep-to.

**Mangrove island** lies about midway between Rong Sam Lem and the mainland, with a sunken rock half a mile westward of it. A patch of  $4\frac{1}{2}$  fathoms lies nearly one mile north of the east point of Mangrove island, and another patch of  $4\frac{1}{2}$  fathoms at  $1\frac{1}{2}$  miles southward of the same point.

Elbow island lies close to the main shore eastward of Mangrove island, with Square rock, above water, about a mile north-west of it.

**Koh Rong**,  $2\frac{1}{4}$  miles northward of Rong Sam Lem, is 8 miles in length, north-west and south-east, 5 miles in breadth, and 1,158 feet in height. Its western and northern sides are apparently steep-to, but a bank with depths of 3 to 5 fathoms (one patch of  $1\frac{1}{2}$  fathoms) extends about  $3\frac{1}{2}$  miles north-east of the north-east extreme of the island, and another with from 4 to 5 fathoms projects about  $2\frac{1}{2}$  miles south-eastward from its south-east side. On the east side of the island vessels may lie sheltered in the south-west monsoon period in depths of 4 to 8 fathoms.

\*Lat.  $10^{\circ} 44' N.$   
Long.  $102^{\circ} 53' E.$

Condor reef\* and Jan Peter reef, about 15 and 27 miles westward of Koh Rong, are described with other offing dangers on page 368.

†Lat.  $10^{\circ} 49' N.$   
Long.  $103^{\circ} 10' E.$

Between Koh Rong and the mainland northward is Middle island,† with a rocky shoal projecting  $1\frac{1}{2}$  miles eastward from it on which the depth is  $1\frac{1}{2}$  to  $3\frac{1}{2}$  fathoms; there are several islets and rocks between it and Samit

point, and between Middle island and Koh Rong is another island fairly steep-to. There is a rock above water about midway between Middle island and the point of the bay 9 miles eastward of it, with a sunken reef on its south side; there is another rock or reef about a mile north-east of it.

**Kampongsom bay**, within the island just described, is about 22 miles wide, with depths of 7 to 8 fathoms, apparently free from dangers, other than those mentioned with the islands. At 7 miles eastward of Koh Rong it is reduced to a width of 14 miles within which is the estuary of Kampongsom river.

The north shore of the bay is mostly low with mangroves, but it rises to 300 feet at the estuary of the river; on the south side it attains an elevation of 500 feet. There are several villages around the shores of the bay.

**Direction.**—The channel from the southward between Rong Sam Lem and Mangrove island reef is  $3\frac{1}{2}$  miles wide, with depths of 11 to 13 fathoms; that between Rong Sam Lem and Koh Rong is nearly 2 miles wide, with a depth of about 10 fathoms; both are safe, but the bottom in the latter is rocky and not suitable for anchoring. The channel between Koh Rong and the islet north of it is  $1\frac{1}{2}$  miles wide, with depths of  $5\frac{1}{2}$  to 7 fathoms. They are all easily available by a steam-vessel.

The town of Kampongsom is about 30 miles up the river or about 55 miles from Koh Rong. It is a place of considerable trade.

**KOH SAMIT.**—Samit point, 500 feet in height, is the north point of approach to Kampongsom bay. About 2 miles north-west of it is Koh Samit about  $1\frac{1}{2}$  miles in extent and 400 feet in height. (Another island of the same name lies about 75 miles north-westward, page 383.) Between the island and the mainland the water is shallow but there is shelter for small trading craft. Two other islands are situated at 3 and 6 miles northward of Koh Samit within the 5-fathoms contour-line; rocks above water extend  $1\frac{1}{2}$  miles north-west of Samit point.

A round island, 500 feet in height, lies about 4 miles N. by W. of Koh Samit, apparently steep-to. Table rock, 200 feet high, lies 3 miles north of the round island with a patch of  $4\frac{1}{2}$  fathoms off its south-west side. Some islets 300 feet in height lie south-west of the point westward of Quoin hill.

**Intended light.**—From a lighthouse in course of construction on the west side of Koh Samit, will be exhibited at an elevation of 279 feet above high water a *flashing white* light, showing a group of *two flashes* every *fifteen seconds*, and visible in clear weather from a distance of about 23 miles.

**Coast.**—Between Samit point and Koh Kong, 23 miles to the northward, the land is hilly near the coast, forming rocky bluffs to seaward

Charts. 2,722  
[2,961],  
2,101 [2,692]  
Var. 2° E.

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[2,961].  
8,101 [2,691]  
Var. 2° E.

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\*Lat.  $10^{\circ} 44' N.$   
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**Condor reef\*** and **Jan Peter reef**, about 15 and 27 miles westward of Koh Rong, are described with other offing dangers on page 368.

†Lat.  $10^{\circ} 49' N.$   
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point, and between Middle island and Koh Rong is another island fairly steep-to. There is a rock above water about midway between Middle island and the point of the bay 9 miles eastward of it, with a sunken reef on its south side; there is another rock or reef about a mile north-east of it.

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**Direction.**—The channel from the southward between Rong Sam Lem and Mangrove island reef is  $3\frac{1}{2}$  miles wide, with depths of 11 to 13 fathoms; that between Rong Sam Lem and Koh Rong is nearly 2 miles wide, with a depth of about 10 fathoms; both are safe, but the bottom in the latter is rocky and not suitable for anchoring. The channel between Koh Rong and the islet north of it is  $1\frac{1}{2}$  miles wide, with depths of  $5\frac{1}{2}$  to 7 fathoms. They are all easily available by a steam-vessel.

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**Coast.**—Between Samit point and Koh Kong, 23 miles to the northward, the land is hilly near the coast, forming rocky bluffs to seaward

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Charts, 2,722  
[2,961]  
2,101 [2,692]  
Var. 2° E.

**RONG SAM LEM**, the southernmost of a chain of islands, is 5 miles in length, north and south, 780 feet in height at its north end, and wooded; its coasts are steep-to.

Lat.  $10^{\circ} 32\frac{1}{2}'$  N.  
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**Intended light** on the south end of Rong Sam Lem. The light will be *quick-flashing, red*, elevated 312 feet above high water, and visible at the distance of 24 miles in clear weather. *Lighthouse building.*

**Saracen bay**, on the east side of Rong Sam Lem, almost divides it into two parts, and affords good anchorage, the shores being high and the entrance fronting the mainland. The bay is 2 miles in length and one mile wide in the entrance, with depths of 5 to 6 fathoms over a considerable portion of it. The bottom is flat and generally sandy, decreasing in depth towards the shore. There are no dangers in the southern arm, at the head of which is a sandy beach, but the south side of the northern arm is encumbered with sunken rocks southward of the two rocks shown on the plan.

A patch of  $4\frac{1}{2}$  fathoms is charted  $1\frac{1}{2}$  miles east of the north point of the bay.

Wood and fresh water may be obtained at the head of the bay, but owing to the shallow water, it is difficult to embark. A more convenient watering place will be found just northward of the bay, where the beach is steep-to.

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A patch of  $4\frac{1}{2}$  fathoms is charted  $1\frac{1}{2}$  miles east of the north point of the bay.

Wood and fresh water may be obtained at the head of the bay, but owing to the shallow water, it is difficult to embark. A more convenient watering place will be found just northward of the bay, where the beach is steep-to.

**Mangrove island** lies about midway between Rong Sam Lem and the mainland, with a sunken rock half a mile westward of it. A patch of  $4\frac{1}{2}$  fathoms lies nearly one mile north of the east point of Mangrove island, and another patch of  $4\frac{1}{2}$  fathoms at  $1\frac{1}{2}$  miles southward of the same point.

Elbow island lies close to the main shore eastward of Mangrove island, with Square rock, above water, about a mile north-west of it.

**Koh Rong**,  $2\frac{1}{2}$  miles northward of Rong Sam Lem, is 8 miles in length, north-west and south-east, 5 miles in breadth, and 1,158 feet in height. Its western and northern sides are apparently steep-to, but a bank with depths of 3 to 5 fathoms (one patch of  $1\frac{1}{2}$  fathoms) extends about  $3\frac{1}{2}$  miles north-east of the north-east extreme of the island, and another with from 4 to 5 fathoms projects about  $2\frac{1}{2}$  miles south-eastward from its south-east side. On the east side of the island vessels may lie sheltered in the south-west monsoon period in depths of 4 to 8 fathoms.

\*Lat.  $10^{\circ} 44' N.$   
Long.  $102^{\circ} 53' E.$

**Condor reef\*** and **Jan Peter reef**, about 15 and 27 miles westward of Koh Rong, are described with other offing dangers on page 368.

†Lat.  $10^{\circ} 49' N.$   
Long.  $103^{\circ} 10' E.$

Between Koh Rong and the mainland northward is Middle island,† with a rocky shoal projecting  $1\frac{1}{2}$  miles eastward from it on which the depth is  $1\frac{1}{2}$  to  $3\frac{1}{2}$  fathoms; there are several islets and rocks between it and Samit

point, and between Middle island and Koh Rong is another island fairly steep-to. There is a rock above water about midway between Middle island and the point of the bay 9 miles eastward of it, with a sunken reef on its south side; there is another rock or reef about a mile north-east of it.

**Kampongsom bay**, within the island just described, is about 22 miles wide, with depths of 7 to 8 fathoms, apparently free from dangers, other than those mentioned with the islands. At 7 miles eastward of Koh Rong it is reduced to a width of 14 miles within which is the estuary of Kampongsom river.

The north shore of the bay is mostly low with mangroves, but it rises to 300 feet at the estuary of the river; on the south side it attains an elevation of 500 feet. There are several villages around the shores of the bay.

**Direction.**—The channel from the southward between Rong Sam Lem and Mangrove island reef is  $3\frac{1}{2}$  miles wide, with depths of 11 to 13 fathoms; that between Rong Sam Lem and Koh Rong is nearly 2 miles wide, with a depth of about 10 fathoms; both are safe, but the bottom in the latter is rocky and not suitable for anchoring. The channel between Koh Rong and the islet north of it is  $1\frac{1}{2}$  miles wide, with depths of  $5\frac{1}{2}$  to 7 fathoms. They are all easily available by a steam-vessel.

The town of Kampongsom is about 30 miles up the river or about 55 miles from Koh Rong. It is a place of considerable trade.

**KOH SAMIT.**—Samit point, 500 feet in height, is the north point of approach to Kampongsom bay. About 2 miles north-west of it is Koh Samit about  $1\frac{1}{2}$  miles in extent and 400 feet in height. (Another island of the same name lies about 75 miles north-westward, page 383.) Between the island and the mainland the water is shallow but there is shelter for small trading craft. Two other islands are situated at 3 and 6 miles northward of Koh Samit within the 5-fathoms contour-line; rocks above water extend  $1\frac{1}{2}$  miles north-west of Samit point.

A round island, 500 feet in height, lies about 4 miles N. by W. of Koh Samit, apparently steep-to. Table rock, 200 feet high, lies 3 miles north of the round island with a patch of  $4\frac{1}{2}$  fathoms off its south-west side. Some islets 300 feet in height lie south-west of the point westward of Quoin hill.

**Intended light.**—From a lighthouse in course of construction on the west side of Koh Samit, will be exhibited at an elevation of 279 feet above high water a *flashing white* light, showing a group of *two flashes* every *fifteen seconds*, and visible in clear weather from a distance of about 23 miles.

**Coast.**—Between Samit point and Koh Kong, 23 miles to the northward, the land is hilly near the coast, forming rocky bluffs to seaward

Charts, 2,722  
[2,961].  
2,101 [2,692]  
Var. 2° E.

**RONG SAM LEM**, the southernmost of a chain of islands, is 5 miles in length, north and south, 780 feet in height at its north end, and wooded; its coasts are steep-to.

Lat. 10° 32' N.  
Long. 103° 18' E.

**Intended light** on the south end of Rong Sam Lem. The light will be *quick-flashing, red*, elevated 312 feet above high water, and visible at the distance of 24 miles in clear weather. *Lighthouse building.*

**Saracen bay**, on the east side of Rong Sam Lem, almost divides it into two parts, and affords good anchorage, the shores being high and the entrance fronting the mainland. The bay is 2 miles in length and one mile wide in the entrance, with depths of 5 to 6 fathoms over a considerable portion of it. The bottom is flat and generally sandy, decreasing in depth towards the shore. There are no dangers in the southern arm, at the head of which is a sandy beach, but the south side of the northern arm is encumbered with sunken rocks southward of the two rocks shown on the plan.

A patch of 4½ fathoms is charted 1½ miles east of the north point of the bay.

Wood and fresh water may be obtained at the head of the bay, but owing to the shallow water, it is difficult to embark. A more convenient watering place will be found just northward of the bay, where the beach is steep-to.

**Mangrove island** lies about midway between Rong Sam Lem and the mainland, with a sunken rock half a mile westward of it. A patch of 4½ fathoms lies nearly one mile north of the east point of Mangrove island, and another patch of 4½ fathoms at 1½ miles southward of the same point.

Elbow island lies close to the main shore eastward of Mangrove island, with Square rock, above water, about a mile north-west of it.

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\*Lat. 10° 44' N.  
Long. 102° 53' E.

**Condor reef\*** and **Jan Peter reef**, about 15 and 27 miles westward of Koh Rong, are described with other offing dangers on page 368.

†Lat. 10° 49' N.  
Long. 103° 10' E.

Between Koh Rong and the mainland northward is Middle island,† with a rocky shoal projecting 1½ miles eastward from it on which the depth is 1½ to 3½ fathoms; there are several islets and rocks between it and Samit

point, and between Middle island and Koh Rong is another island fairly steep-to. There is a rock above water about midway between Middle island and the point of the bay 9 miles eastward of it, with a sunken reef on its south side; there is another rock or reef about a mile north-east of it.

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**Direction.**—The channel from the southward between Rong Sam Lem and Mangrove island reef is  $3\frac{1}{2}$  miles wide, with depths of 11 to 13 fathoms; that between Rong Sam Lem and Koh Rong is nearly 2 miles wide, with a depth of about 10 fathoms; both are safe, but the bottom in the latter is rocky and not suitable for anchoring. The channel between Koh Rong and the islet north of it is  $1\frac{1}{2}$  miles wide, with depths of  $5\frac{1}{2}$  to 7 fathoms. They are all easily available by a steam-vessel.

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A round island, 500 feet in height, lies about 4 miles N. by W. of Koh Samit, apparently steep-to. Table rock, 200 feet high, lies 3 miles north of the round island with a patch of  $4\frac{1}{2}$  fathoms off its south-west side. Some islets 300 feet in height lie south-west of the point westward of Quoin hill.

**Intended light.**—From a lighthouse in course of construction on the west side of Koh Samit, will be exhibited at an elevation of 279 feet above high water a *flashing white* light, showing a group of *two flashes* every *fifteen seconds*, and visible in clear weather from a distance of about 23 miles.

**Coast.**—Between Samit point and Koh Kong, 23 miles to the northward, the land is hilly near the coast, forming rocky bluffs to seaward

Lat.  $10^{\circ} 53' N.$   
Long.  $103^{\circ} 3' E.$

Charts, 2,722  
[2,961].  
2,101 [2,692]  
Var.  $2^{\circ}$  E.

**RONG SAM LEM**, the southernmost of a chain of islands, is 5 miles in length, north and south, 780 feet in height at its north end, and wooded; its coasts are steep-to.

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**Coast.**—Between Samit point and Koh Kong, 23 miles to the northward, the land is hilly near the coast, forming rocky bluffs to seaward

Charts, 2,723  
[2,691],  
2,721 [2,680].  
Var. 2° E.

with sandy bays between. These bays generally have deep water in them, and afford good anchorage with offshore winds. The highest and most remarkable hill about this part is the Quoin, 1,155 feet in height.

Lat. 11° 6' N.  
Long. 102° 46' E.

**Kusrovie rock**, situated N.W.  $\frac{3}{4}$  W., 21 miles from Koh Samit and 15 miles from the south extreme of Koh Kong, is about 150 yards in diameter and 36 feet high. Its sides are shelving, and isolated rocks extend half a cable from it.

**Ubon Boratit shoal**, situated N.  $\frac{3}{4}$  E. 9 cables from Kusrovie rock, is formed of coral and sand, with depths varying from one to 8 fathoms, the least water upon it being 5 feet.

A patch of 3 fathoms lies S.W. by W., distant  $4\frac{1}{2}$  cables from the shoal. There is deep water between these two shoals, and between them and Kusrovie rock.

Lat. 11° 11' N.  
Long. 102° 47' E.

**Ellen Bangka rock**.—In 1870 the Netherlands India barque *Ellen Bangka* struck twice on a shoal on which there was only 11 feet water. At the time, the vessel was stated to be 5 or 6 miles north of Kusrovie rock which was visible from the deck; the approximate position of the danger is given in the margin.

**KOH KONG**, 21 miles northward of Koh Samit, is a table-topped island, 11 miles in length, north and south,  $3\frac{1}{2}$  miles wide, 1,500 feet in height at its north end, and covered with trees. It has some sandy beaches along its western shore, which is fairly steep-to, but the island offers no sheltered anchorages or other advantages to shipping. It is inhabited by fishermen.

Within Koh Kong there is a shallow bay into which numerous small rivers discharge; they are not generally approached excepting in the flat-bottom boats of the country. The channel into this bay from the southward lies close along the eastern side of the island; it is narrow and is said to have only 9 feet at low water, but the chart shows not less than 3 fathoms.

The mainland within Koh Kong is very low as far as it is visible to the eastward, but it rises to the northward with great regularity until it joins the high table land abreast Koh Kut.

Phra Chanta Nakara, the point on the north side of the channel northward of Koh Kong, has a small islet lying about half a mile north-west of it.

**Klong Koh Kong**.—Two rivers of some size enter the sea at 6 and  $8\frac{1}{2}$  miles northward of Koh Kong; the northernmost, named Koh Kong, has a depth of 3 feet on its bar at low water, and may be known by a remarkable mound,\* 400 feet in height, forming a bluff on the coast line,

\*Lat. 11° 35' N.  
Long. 102° 55' E.

2 miles northward of the entrance. The edge of the shallow bank off these rivers is steep-to and  $2\frac{1}{2}$  miles from the shore.

Charts, 2,723  
[2,691],  
2,781 [3,690].  
Var. 2° E.

Lat. 11° 38' N.  
Long. 102° 56' E.

**The COAST**, from the Klong Koh Kong, trends in a north-north-west direction 40 miles to Tung Yai bay, with regular depths off it. With the exception of two rocky bluffs, the land near the sea is low, and fringed by a sandy beach pierced by numerous small streams; but parallel to the coast, at the distance of 2 or 3 miles inland, a table land rises with great regularity to the height of more than 2,000 feet. This mountain mass rises at the distance of a few miles north-east of Tung Yai river, and falls again at the Klong Koh Kong; one of its most elevated points was found to be 4,000 feet in height. The channel between the mainland and Koh Kut is clear, with regular depths.

**KOH KUT**, lying 16 miles off the coast and 25 miles N.W. by W. of Koh Kong, is the southernmost of a group of islands extending in a direction parallel to the coast for a distance of 40 miles and fronting Tung Yai bay. It is a high level island with steep cliffy sides. There are two small conical peaks in its southern portion, the highest of which (the northernmost) is 1,171 feet in height.

Good anchorage for small craft will be found in a bay near the north west end of Koh Kut, with a stream of fresh water running into it. The bay, on the eastern side, would afford shelter in the south-west monsoon period.\* Fresh water may also be obtained on this side about a mile from the north point of the island.

\*Lat. 11° 43' N.  
Long. 102° 33' E.

**Koh Mak**, lying 4 miles north-west of the north end of Koh Kut, is 4 miles in length, east and west, and generally rather low, excepting its west extreme, which is a rocky headland, 350 feet in height.

A coral flat extends  $4\frac{3}{4}$  miles north-eastward from Koh Mak, on which is the islet of Koh Kahdut. At the north-eastern extreme of the flat is Richelieu patch, with 2 fathoms water over it.

Koh Mak is inhabited by fishermen engaged in collecting bêche-de-mer. There is a channel 3 miles wide between the archipelago of islands south of Koh Chang and Koh Mak, with apparently not less than 5 fathoms water; and there is a good channel  $3\frac{1}{2}$  miles wide with depths of 9 to 10 fathoms between Koh Mak and Koh Kut.

**Koh Chang**, situated 7 miles north-north-westward of Koh Mak, is 16 miles in length north-west and south-east, and about 6 miles in breadth, having several peaked hills intersected by rocky and precipitous ravines. The highest part of the island (a table peak near its centre) is 2,446 feet in height.† Notwithstanding the numerous islands and rocks that fringe Koh Chang, no dangers were discovered near its shores but what were apparent. There is a native government station at a low point on its eastern side, and

†Lat. 12° 14' N.  
Long. 102° 19' E.

Chart, 2,721  
[2,600].  
Var. 2° E.

one is also charted on the mainland abreast it. Tigers were said to be numerous on the island. Fresh water can be obtained on the western side of Koh Chang, about 3 miles from the north point.

**LIGHT.**—A *fixed white* light, elevated 26 feet above high water, and visible from a distance of 4 miles, is exhibited from a white pyramidal beacon on a rock 4 feet high lying in the fairway northward of Koh Chang, and situated S.E. by S. 2 miles from Lem Ling.

Lat. 12° 10' N.  
Long. 101° 50' E.

**Reported danger.**—A sunken rock is reported to exist about 23 miles west of the north end of Koh Chang, in the position noted.

Lat. 12° 3' N.  
Long. 102° 37' E.

**TUNG YAI BAY** lies within Koh Kut, Koh Chang, and the islands between them, and affords good anchorage in depths of 4 to 5 fathoms, with Lem Nam bearing about West, distant 4 miles. Sunken rocks extend upwards of a mile southward of Lem Nam and nearly the same distance north-eastward of that point, all lying within the 3-fathoms line fronting the bay. The head of the bay has depths of less than 3 fathoms for a distance of 6 miles from its head.

**Directions.**—The widest approach to Tung Yai bay is that from the southward between Koh Kut and the mainland, in which there is sufficient water for vessels of any draught, but a good look-out should be kept as the soundings taken are but few. The entrance immediately north of Koh Kut is also good, being 3½ miles wide, with depths of 9 to 10 fathoms. The channel between Koh Mak and the several islands north of it has apparently not less than 5 fathoms and is 3 miles wide. The channel from the northward between Koh Chang and the mainland has from 3 to 4 fathoms, but it should not be used except by small craft; this channel is described below.

**Tung Yai river** falls into the head of the bay; it is only navigable for boats. There is a village about 7 miles from the entrance of the river, but the natives stated that the town of Tung Yai stands a short distance inland from the eastern bank. On the eastern side of the shallow part of the head of Tung Yai bay is the village of Tem, and on the opposite side is another village within which is that of Krat.

Lat. 12° 12' N.  
Long. 102° 15' E.

**Lem Ling.**—**North channel to Tung Yai bay.**—From Lem Nam the coast takes a north-west direction for 20 miles to Lem Ling, fronted by the Tung Yai bank, which extends more than half way across to Koh Chang; near its middle and about a mile within its edge are the Hin Mun Chang, a clump of black rocks 5 feet high. Sarlak island, 200 feet high, lies in the fairway south-westward of Hin Mun Chang.

A small mangrove islet lies close to Lem Ling, and the ground is foul for a short distance off it, and also for more than a mile along the shore to the northward; but Lem Ling is quite clear to the south-west.

The channel between Lem Ling and Koh Chang is  $2\frac{1}{2}$  miles wide. Chart, 2,721 [2,680].  
Rocky patches, with from a half to 2 fathoms water, extend 6 cables south-eastward from the lighthouse rock, and a small rock with one foot of water lies N.E. by E.  $\frac{1}{4}$  E. 9 cables from it; others may exist. The best water in the channel lies on the Koh Chang shore, and as the edge of the Tung Yai bank is rocky it must be approached with caution.

**The COAST** from Lem Ling trends 20 miles north-westward to Lem Sing, the western point of entrance to Chentabun river. The shore between is low mangrove, but a short distance from it and 5 miles from Lem Sing, are three small islands ranging from 200 to 400 feet in height.

**Koh Chik**, an island 349 feet in height and nearly a mile in length, lies in the fairway of the approach to an inlet charted nearly a mile in width. A bar with less than 3 fathoms extends 2 miles seaward of the island on which there is a charted depth of 10 feet at low water. Nothing is known of this inlet. A smaller island lies between Koh Chik and the south point of entrance.

**Light**.—Upon the north-west point of Koh Chik, a *fixed white* light, elevated 48 feet above high water is exhibited occasionally; it is said to be visible at the distance of about 12 miles in clear weather.

**Alabaster rocks**,  $7\frac{1}{2}$  miles southward of the entrance of Chentabun river, are two small rocks, about 40 feet apart, lying nearly north and south from each other. The southern and larger one dries 3 feet at low water springs and is 14 feet in length; the northern one dries 2 feet. There is a depth of 2 fathoms between and around them with 5 fathoms at a short distance. Fishermen say they can trace a line of rocky bottom to Cone island.

From the Alabaster rocks, Cone island bears N.  $\frac{3}{4}$  W., distant 7 miles, and the southernmost of the three islands abreast N.E. by E.  $\frac{8}{9}$  E.

**CHENTABUN RIVER**.—The position of this river may be recognised from a distance by Kau Sabap, a mountain, 2,990 feet in height, situated N.E. by E. 10 miles from its entrance; also by Cone island, 405 feet high, lying 2 miles westward of the entrance.

**Navigable depths**.—Koh Chula or Bar island lies in the entrance, and is surrounded by the flat with less than 2 fathoms water which extends from the eastern shore; between it and the rocks which extend  $1\frac{1}{2}$  cables off the west point of entrance, is the channel  $2\frac{1}{2}$  cables wide into the river, with 13 feet at low water; it is necessary to moor in the river as the streams are strong. Vessels of 12 feet draught can go about  $1\frac{1}{2}$  miles above Paknam, to abreast the church. The town of Chentabun is about 14 miles up; steam launches of about 4 feet draught can reach the town with local assistance.

The village of Paknam is situated on the east side of the entrance.

Chart. 2,721  
[2,690].  
Var. 2° E.

**Anchorage.**—A convenient anchorage for small craft, in a depth of 4 fathoms, may be obtained without the bar, with Koh Chula bearing N.E. by E., distant one mile. Fishing stakes are numerous on the banks. Fresh stock is scarce, but an abundance of good water may be procured in a small bay westward of Lem Sing.

**Tides.**—It is high water, full and change, at the entrance of the Chentabun at 10h. Om., springs rise  $5\frac{1}{2}$  feet. The highest tide occurs on the day after new moon. Here, as in the Bangkok river, the streams run for twelve hours at the full and change, and are subject to great irregularity.

Lat. 12° 30' N.  
Long. 101° 56' E.

**THE COAST** north-westward from Chentabun river is generally flat, with hills in the distance. Koh Saba is a small island, 5 miles from Cone island, lying close off the west point of entrance to the river Kem Nu.

**A reef**, consisting of three heads which dry 3 feet at low water, and is steep-to to seaward, lies just within the edge of the bank which fronts the shore, W. by N.  $\frac{3}{4}$  N. about  $1\frac{1}{4}$  miles from the west entrance point of the Kem Nu.

**Parat bay**, north-westward of Koh Saba, is about 13 miles wide ; the rivers Parat and Pa Sair or Pa Se discharge into it. The eastern shore of the bay is fringed by a bank to the distance of  $1\frac{3}{4}$  miles, on the edge of which, off Parat river, is Volant rock with one foot of water. Off the western shore the bank is foul and rocky and extends about 6 miles south-east of the west point of the bay. A sand patch with one fathom water lies close to its edge, S.W. by W.  $\frac{1}{4}$  W. about 3 miles from Volant rock. Three islands are situated on the prolongation of the bank southward ; Koh Mon, the largest and outermost, is 6 miles off shore.\*

\*Lat. 12° 34' N.  
Long. 101° 41' E.

**LIGHT.**—On the west entrance point of the Pa Sair or Pa Se river, at an elevation of 24 feet above high water, a *fixed white* light is occasionally exhibited, said to be visible in clear weather at the distance of 10 miles.

**Loftus rock**, situated S.E. by E. about three-quarters of a mile from Koh Mon, is of coral, steep-to, with  $1\frac{1}{2}$  feet water over it, and 5 or 6 fathoms around.

The native pilots report a rock, named Hin ui eorp, visible at half-tide, as lying in a direct line between Mon Klong and Tung Kaben bay, about 5 miles from the latter.

Lat. 12° 33 $\frac{1}{2}$ ' N.  
Long. 101° 47' E.

Hin Lawp, a rock lying E.  $\frac{1}{4}$  S., distant 6 miles from Koh Mon, dries 3 feet at low water springs ; shoal water extends three-quarters of a cable to the eastward of it, with depths of 4 to 6 fathoms around.

**ALHAMBRA ROCKS**, lying with Koh Mon bearing N. by E., Chart. 2,721.  
[2,690]. distant  $8\frac{1}{2}$  miles, are coral patches  $2\frac{1}{4}$  cables apart in a north-east and south-west direction and steep-to, having 9 fathoms water between them. Lat.  $12^{\circ} 25\frac{1}{4}'$  N.  
Long.  $101^{\circ} 39'$  E.  
Var.  $2^{\circ}$  E. The south-western rock is nearly awash at low water spring tides, and the sea then breaks heavily on it in bad weather; the north-eastern rock has 6 feet over it.

**Buoy.**—A black conical buoy lies about  $1\frac{1}{2}$  cables south-eastward of the south-west rock; not to be depended on.

**Victory shoal**, composed of coral, was reported by the vessel Lat.  $12^{\circ} 18'$  N.  
Long.  $101^{\circ} 17'$  E. *Victory*, in the year 1879, as being situated approximately as noted. From this position the south extreme of Koh Samit bears N.N.E.  $\frac{3}{4}$  E., distant 16 miles.

**Coast.**—Koh Tulu lies midway between Koh Mon and Koh Samit, Lat.  $12^{\circ} 33\frac{1}{4}'$  N.  
Long.  $101^{\circ} 33'$  E. with rocks extending half a mile south-east of it.

**Buoy.**—At  $1\frac{1}{4}$  miles north of Koh Tulu are two rocks 50 yards apart, dry at low water; a red buoy with topmark is placed on the north side of these rocks, but is not to be depended on. The channel between them and the 5-fathoms line fronting the shore is 2 miles wide, with a depth of 6 fathoms.

**KOH SAMIT** is wedge-shaped,  $3\frac{1}{2}$  miles in length, and 424 feet in height at its north end, which is its widest part. It lies 3 miles off the shore of the bight eastward of Lem Ya, and is connected with it by a bank with less than 3 fathoms water, and nearly so with that extending from Lem Ya, distant  $1\frac{1}{4}$  miles. (Another island of the same name lies about 75 miles south-eastward, page 377.) There is a patch of 2 fathoms at about one mile north of the north-west extreme of Koh Samit, and one with less than 6 feet at half a mile off the north side of the island.

**Light.**—On the north-west point of Koh Samit a *fixed white* light is Lat.  $12^{\circ} 35'$  N.  
Long.  $101^{\circ} 25\frac{1}{4}'$  E. exhibited occasionally.

**Chong Samit** is the narrow passage between the island and Lem Ya, and possibly carries 3 fathoms water.

**A rock**, 70 yards in extent, composed of boulders, is reported to lie in the fairway, with the north point of Koh Samit, bearing N.E.  $\frac{1}{2}$  E., and Lem Ya, N.N.W.  $\frac{1}{2}$  W.

**Tree islet** lies half a mile southward of Koh Samit, and half a mile beyond is Brown rock above water,\* with a sunken rock close eastward \*Lat.  $12^{\circ} 30'$  N.  
Long.  $101^{\circ} 25\frac{1}{4}'$  E. of it.

**Lem Ya** is 397 feet in height, and there is a range of conical hills extending from it 15 miles inland; the highest and northernmost is 2,470 feet in height. On each side of this headland the coast is low.

General chart, 2,414 [2,692].

Charts, 2,721  
[2,690].  
2,720 [2,687].  
Var. 2°.

**Bush rock**, W.  $\frac{3}{4}$  S., distant  $2\frac{1}{2}$  miles from Lem Ya, is composed of coral, steep-to, and dry at low water, with 4 fathoms around.

**Buoy**.—A black and white horizontally striped buoy is moored half a cable southward of the rock, but it is not to be depended on.

**Coast**.—The bay to the westward of Lem Ya is fringed with a sandy beach to its western extreme, Lem Sahemsan or cape Liant, distant 27 miles. Nearly midway, at about  $1\frac{1}{2}$  miles off shore, is Koh Sakait with sunken rocks around it, but all lying within the 3-fathoms edge of the bank fronting the coast. A stream on which is the village of Rayong discharges abreast this island.

About 5 miles westward of Koh Sakait are rocks above water, also within the edge of the shore bank.

Lat.  $12^{\circ} 36\frac{1}{2}'$  N.  
Long.  $100^{\circ} 57'$  E.

**CAPE LIANT or Lem Sahemsan**.—Cape Liant is the south-east extreme of the promontory forming the east point of the entrance of Bangkok bay.

**Light**.—On the south-east extreme of cape Liant, a *fixed white* light is exhibited occasionally, visible at the distance of 6 miles in clear weather.

On approaching cape Liant from the southward, the islands Chuen and Me san off it, being the highest land in the neighbourhood, will be first seen. Hin Chalan, the outermost island, will not be observed until it is within the distance of 5 miles; it is a white rock 40 feet high, and steep-to.

The channel between Hin Chalan and Chuen is  $2\frac{1}{2}$  miles wide, with deep water. The channel between Chuen and Me san is a mile in width, and deep; Sail rock, 45 feet high, lies in its western approach and Koh Ronkon, 118 feet high, at its eastern end. There are no dangers shown on the chart.

Chong Me san, the channel between cape Liant and Koh Riat, is only a quarter of a mile wide, but is much used by coasting craft and has apparently a depth of 4 fathoms. During springs the tidal stream runs with considerable velocity through it, so that it should never be attempted by a sailing vessel without a fair and commanding breeze. A spit with 2 fathoms or less extends one mile north-westward of Koh Me san, forming the south side of the entrance from the westward; the mainland is bordered by shallow water to a short distance beyond the points of the bays.

Lat.  $12^{\circ} 31'$  N.  
Long.  $100^{\circ} 56'$  E.

**LIGHT.—Koh Chuen**.—From a white lighthouse on the summit of Koh Chuen, is exhibited at an elevation of 466 feet above high water, a *group-flashing white* light with a period of *twenty seconds*, showing thus:—Flash, *one-and-a-half seconds*; eclipse, *three-and-a-half seconds*;

General chart, 2,114 [2,682].

flash, *one-and-a-half seconds*; eclipse, *thirteen-and-a-half seconds*. It is visible in clear weather from a distance of 29 miles.

Chart, 2,720  
[2,687].  
Var. 2° E.

A sector of *fixed red* light is shown from the same lighthouse over Hin Chalan, a rock 40 feet in height, situated  $3\frac{1}{2}$  miles to the southward.

**Sheltered bay**, at 3 miles north-westward of cape Liant, is about  $\frac{1}{4}$  miles wide, with good anchorage in about 3 fathoms water, sheltered by several small islands fronting its entrance. Koh Yoh, the outer island, is of conical form; shoal ground with depths of from 3 to 5 fathoms extends 2 miles in an east and west direction at about one mile southward of Koh Yoh. The eastern horn of this bay may be known by a cone-shaped hill 454 feet in height. Koh Tki lies south-westward of the conical hill, and has a reef extending nearly to the rock above water three-quarters of a mile northward of it. A patch of  $3\frac{3}{4}$  fathoms lies about a mile W. by S.  $\frac{1}{2}$  S. of Koh Tki. A vessel might be beached or hove down with safety inside Koh Pra. There are a few huts on the northern shore of the bay.

**Tung Kitea bay**.—Lem Putau, the north-west point of **Sheltered bay**, is a bold bluff headland, 600 feet high, close around which to the northward is Tung Kitea bay. Fresh water can be obtained in the south-east corner of this bay, but in other respects it is an undesirable anchorage.

Lat. 12° 39' N.  
Long. 100° 50' E.

**KOH KRAM** is 3 miles in length, north and south, 2 miles in breadth, and 704 feet in height near its south end; its western coast is fairly steep-to, but a reef extends half a mile from the eastern side, with an isolated patch beyond; on the east side of the south extreme a reef projects nearly half a mile.

The bay on the north-west side of Koh Kram is half a mile wide at its entrance with a depth of about 7 fathoms, and there is about 3 fathoms at half a mile from its head; it might afford temporary anchorage. There is a strong stream or current off West point, but it is scarcely perceptible in the bay.

Lat. 12° 43' N.  
Long. 100° 45' E.

Plan on chart,  
2,720 [2,687].

**Tung Plong bay** on the mainland, being sheltered by Koh Kram and Koh Ira, offers secure anchorage for small craft.

**The Channel** between Koh Kram and the mainland is nearly two miles wide with a fairway depth of from 6 to 10 fathoms. The best channel is apparently eastward of Koh Ira, keeping close to the mainland. The channel westward of Koh Ira and then eastward of Sombrero appears safe also.

Koh Ira lies in the fairway of the southern entrance of this channel; its south and east sides are fringed by a reef with an islet or rock beyond; at 2 cables north-eastward of this island, there is a rocky reef.

General chart, 2,414 [2,682].

E 32369.

B B

Chart, 2,720  
[2,887].  
Var.  $1\frac{1}{4}$ ° E.

Sombrero rock or Hin Luk Kai, lies three-quarters of a mile from the south-east side of Koh Kram (the chart shows another island or rock westward of it).

**Koh Rin and Koh Pai.**—At 16 miles north-north-west of Koh Kram is Koh Luem: between these is a chain of islets, namely, Koh Rin, 360 feet in height; Kring Badung, 194 feet; Mana Mechi, 154 feet; and the larger island Koh Pai, 541 feet in height and 2 miles in length. There are several rocks around Koh Rin all above water; the highest are White rock 50 feet, and Tree rock 51 feet, each with a little brushwood on them.

Lat.  $12^{\circ} 56\frac{1}{4}$  N.  
Long.  $100^{\circ} 39\frac{1}{4}$  E.

**Quarantine station.**—There is a quarantine station on the north-eastern side of Koh Pai, and ships arriving from ports declared to be infected by the authorities at Bangkok call here for pratique.

Lat.  $12^{\circ} 57\frac{1}{4}$  N.  
Long.  $100^{\circ} 37\frac{1}{4}$  E.

**KOH LUEM, or PILOT ISLAND**, the northernmost, is three-quarters of a mile in length, half a mile in breadth, steep-to on the south and west sides, and rises from the sea bold and cliffy; its peak is of a dome-like appearance, and 445 feet in height. A reef with 2 to 4 fathoms, and 8 to 13 fathoms close-to, extends at least 2 miles in a northerly direction from Koh Luem. A patch of  $3\frac{1}{2}$  fathoms lies  $1\frac{1}{2}$  miles east of the north extreme of the island.

This island, from its conspicuous and peculiar position, has long been considered the principal landmark at the head of the gulf; before the establishment of the light on Koh Chuen, vessels bound to Bangkok river made it, took their departure from it, and ran boldly for the anchorage off the bar by day or night.

**Koh Lān**, lying between Koh Pai and the shore, is  $2\frac{1}{2}$  miles in length, one mile in breadth, and 685 feet in height. On its eastern side is a village; plantains and pine-apples are plentiful, and a few fish are obtainable (1893). A small island, named North Lān, lies half a mile from its north end, and East Lān, a mile from its north-east side.

At one mile S.  $7^{\circ}$  E. from the summit of East Lān there is a shoal with a depth of  $2\frac{1}{2}$  fathoms over it at low water.

**Buoy.**—A rocky bank, about a cable in extent, with 3 feet water, lies one mile E. by S. of East Lān. A red buoy is moored in 8 feet water on the middle of this bank, but it must not be depended on.

**Anchorage.**—There is good anchorage in the south-west monsoon close under the north-east side of Koh Lān.

**The COAST** between Tung Plong bay and Koh Klet keo, 4 miles to the northward, is composed of high rocky bluffs, with sandy bays between. At  $3\frac{1}{4}$  miles N.W. by W. of Klet keo is Cliff rock, 40 feet high, with a few trees on its summit.

**Lem Patáya**, 9 miles northward of Klet keo, presents a number of low rocky bluffs to seaward, having at a short distance within, a hill 370 feet high. Between Klet keo and Lem Patáya is a deep bay with low land around it.

**Patches.**—A patch of  $2\frac{3}{4}$  fathoms lies N. by E.  $3\frac{1}{4}$  miles from Klet keo, and one of  $2\frac{1}{2}$  fathoms and about a mile in length S.S.W. 3 miles from the hill on Lem Patáya; there are patches of  $4\frac{1}{2}$  and  $4\frac{3}{4}$  fathoms between these, and others may exist.

Between Lem Patáya and Lem Kra Bang 9 miles northward, is a bay from the head of which the shore bank extends  $1\frac{1}{2}$  miles, with no dangers beyond it. At  $1\frac{1}{4}$  miles northward of Lem Patáya is a low rocky islet one cable in extent, and a bank with  $2\frac{3}{4}$  to 3 fathoms lies between a half and  $1\frac{1}{2}$  miles southward of Lem Kra Bang. Lem Kwan is a prominent point in the bay, the coast northward of it being all low.

**Koh Nak** is an islet situated about  $4\frac{1}{2}$  miles south-westward of Lem Kra Bang.

Lat.  $13^{\circ} 13' N.$   
Long.  $100^{\circ} 48' E.$

At Lem Kra Bang commences a range of hills which borders the coast for 8 miles, and thence extending inland joins the Bang Pla Soi mountains.

From Lem Kra Bang to Bang Pra, the coast consists of a number of rocky points, with sandy bays between.

**KOH SI CHANG.**—At 4 miles N.W. by W.  $\frac{1}{2}$  W. of Lem Kra Bang is Kangku island,\* about half a mile in extent and 325 feet in height, the southernmost islet of the Koh si Chang group.

Lat.  $13^{\circ} 7' N.$   
Long.  $100^{\circ} 47' E.$

Koh si Chang, the largest of the group, is about  $3\frac{1}{2}$  miles in length, north and south, by about one mile in breadth; its summit is 608 feet in height, near the north end. Off the eastern side of this island are the islets of Koh Kam yai, 204 feet, Koh Kam noi 80 feet, Koh Plong 34 feet and Koh ran Dokmai, 54 feet high, which afford some shelter to the anchorage off Rai Lang, and Rai Bon, the northern villages in Si Chang.

**Anchorages.**—There is anchorage in a depth of about 4 fathoms, sand and mud, between the south-west extreme of Koh Kam yai and Lem Tarote; this is known as the Man-of-war anchorage. Between the north extreme of Koh Kam yai and Si Chang is the inner anchorage, with depths of 3 to 4 fathoms. The outer anchorage in front of  $4\frac{1}{2}$  to 5 fathoms, is situated about one mile northward of Koh Kam yai.

**Dangers.—Buoys.**—The buoys are not to be relied on. From Koh Kam yai, a flat with less than 3 fathoms extends half a mile north-westward, with a reef partly dry at low water, 2 cables within its extreme.

A red buoy in about 3 fathoms lies one cable north-west of the reef.

The west and south sides of the island are foul to the distance of about a quarter of a mile, and the east and north sides to a less distance.

\*General chart, 2,414 [2,682].

Charts, 2,720  
[2,687].  
1,380 [2,689].  
Var. 11° E.

Reefs surround the three small islets to the distance of about one cable in places, and a similar reef fronts the shore of Si Chang to the distance of about  $1\frac{1}{2}$  cables. These will be best seen on the plan.

**A patch**, with a depth of 2 feet lies off this reef on the edge of the 3-fathoms line, with the hotel at Ban Tarote bearing W.  $\frac{1}{2}$  N., distant  $3\frac{1}{2}$  cables.

A red buoy in about  $3\frac{1}{4}$  fathoms lies near the eastern edge of the reef.

**Hin Kong nok.—Buoy.**—At about 8 cables north of the north-east extreme of Si Chang is Hin Kong nok, a reef about 70 yards in extent, and awash at low water springs. A black and white chequered buoy is placed off its west side.

**Hin sam mah Yeu** is a rock 10 feet high, and about three-quarters of a cable in length, situated about 6 cables north-north-westward of the north-west point of Si Chang.

Lat.  $13^{\circ} 11\frac{1}{2}'$  N.  
Long.  $100^{\circ} 46\frac{1}{2}'$  E.

**LIGHT.**—A *fixed red* light is exhibited from a white tower 15 feet high, on Hin sam mah Yeu, at an elevation of 25 feet above high water. Not to be depended on.

**Tides.**—It is high water, full and change, at Koh si Chang at 6h. 30m. approximate; springs rise from 9 to 11 feet, neaps from  $6\frac{1}{2}$  to 8 feet.

**Supplies.**—Bread, beef, and vegetables may be obtained if sufficient notice is given to get them from Bangkok. Water is obtainable only through the courtesy of the naval authorities at Bangkok, but it is not fit to drink. A little fruit and a few eggs are obtainable. Coal is sent down from Bangkok when ordered.

Nearly all ocean steamers complete their loading here after leaving Bangkok.

There are from 200 to 300 inhabitants.

**Telegraph.**—A submarine cable connects Koh si Chang with the mainland, enabling shipping at Koh si Chang to communicate with Bangkok. The telegraph office is at the north end of the bay in which Rai Lang is situated. There is a signal station on the summit of the island.

**The Health office** is situated at Ban Taa village, on Lem Wat, one mile southward of the man-of-war anchorage. The King has a bungalow palace here.

**Landing piers.**—There is a landing pier named the Royal pier, at Lem Wat, and another, not so good, close to the hotel at Lem Tarote.

**The Channel** between the island and the shore is about  $3\frac{1}{2}$  miles wide, with depths of 10 to 13 fathoms in the fairway, decreasing gradually towards the mainland; it is apparently free from danger.

General chart, 2,414 [2,682].

**COAST.**—**Koh Si Maha racha** is a rocky islet about 90 feet high, lying about a third of a mile from the coast, and East  $6\frac{1}{2}$  miles from the north point of Koh si Chang.

Chart, 2,720  
[2,687].  
Lat.  $13^{\circ} 10' N.$ .  
Long.  $100^{\circ} 54' E.$ .  
Var.  $1\frac{1}{2}^{\circ}$  E.

**Towns.**—The town of Si Maha racha stands on the mainland about half a mile south-east from the islet, and contains about 500 inhabitants; the town of Bang Pra, on the coast, about three miles to the northward, has about 1,000 inhabitants.

**Patch.**—There is a patch of one fathom one mile off Bang Pra, just within the 3-fathoms contour.

**Anchorage.**—There is anchorage for small craft in 3 fathoms, with Koh si Maha racha bearing E. by N. half a mile; the 5-fathoms line is 2 miles off shore.

**Supplies.**—Fresh water is abundant, and the towns of Si Maha racha and Bang Pra could furnish quantities of fresh stock. Game is plentiful. At the distances of half and three-quarters of a mile southward of Bang Pra, are two fine streams of water that discharge over the beach, and the natives say that they never dry. A boat might fill from these streams at high water, but at low tide the sands dry out so far that they could not be approached within half a mile. The soil in this neighbourhood is fertile, and the vicinity of the Bang Pla Soi hills, rising to the height of 2,300 feet, would afford a retreat from the summer heats, and render this spot an admirable position for a European settlement.

Southward to cape Liant the coast is but thinly inhabited, and there are no streams of fresh water near the sea.

**Lem Sah Muk**, or Double head, a prominent bluff rising from the low land to the height of 270 feet, and appearing at a distance like an island, lies 8 miles northward of Koh Si Maha racha; the coast between is fronted by a shallow bank to the distance of  $1\frac{1}{2}$  miles in places, but reduced to half a mile at Lem Sah Muk.

Mount Bang Pla Soi lies 8 miles within Lem Sah Muk, and is 2,497 feet in height.

**Bang Pla Soi.**—At 2 miles north-eastward of Lem Sah Muk is the village of Ang Hin, and 4 miles E.N.E. of Ang Hin, at the head of a shallow mud bight, is the large town of Bang Pla Soi, a place of considerable importance. The town has a good market, but unfortunately it is only accessible from the sea at high water, in consequence of the mud flat, which dries off  $1\frac{1}{2}$  miles. Immediately at the back of the town there is a small range of hills from 400 to 450 feet in height, which is the termination of the high land northward on this side of the gulf.

Charts, 2,720  
[2,687].  
999 [2,688].  
Var. 14° E.

Lat. 13° 22' N.  
Long. 100° 58 $\frac{1}{4}$  E.

**Pier.**—There is a landing pier abreast the town available only near high water.

**Light.**—At Bang Pla Soi, a *fixed white* light, at an elevation of 33 feet above high water, is occasionally exhibited, said to be visible in clear weather from a distance of 10 miles.

Plan on chart,  
790 [2,687].  
Lat. 13° 27' N.  
Long. 100° 56' E.

**BANG PAK KONG RIVER** empties itself into the gulf at 5 miles northward of Bang Pla Soi, and is said to be navigable for small craft as far as Prachin, a distance of 104 miles from the entrance. A mud flat, with depths of less than 6 feet, and covered with fishing stakes, fronts the mouth of the river to the distance of 5 miles.

There is a depth of about 2 feet on the bar at low water springs.

**Beacons.**—The channel is marked by red beacons on the west, and white beacons on the east side. Fairway beacon stands in 6 feet of water at the entrance of the channel. It is a pole with red ball 18 feet above high water. From it Bang Pla Soi bears E. by S.  $\frac{1}{2}$  S. distant 4 $\frac{1}{2}$  miles.

**Tides.**—It is high water, full and change, at Bang pak kong entrance, at 7h.; springs rise 9 $\frac{1}{2}$  feet.

**MENAM CHAU FYA or BANGKOK RIVER** rises in the mountains of Yun nan, is about 300 miles in length, and navigable for small craft for about 60 miles. The city of Bangkok is situated about 25 miles from its mouth, and is accessible to all vessels that can cross the bar. It has many tributaries.

Chiengmai, one of the most important trading centres, is situated on the Mei Ping branch, in about lat. 18° 50' N., long. 99° 55' E. It does a considerable trade with Moulmein as well as with Bangkok; the principal exports are teak, silver, and cattle. Its rainfall in 1897 amounted to 41·57 inches, of which 11·5 inches fell in August.

**The Bar.—Depths.**—The river is about one mile wide between its entrance points, with a depth of 1 $\frac{1}{2}$  to 2 fathoms at low-water springs. The west side of the entrance is fronted by a mud bank, which dries off to a distance of 1 $\frac{1}{2}$  miles, and the east side by one which dries to the distance of a third of a mile.

The bar is a shifting one subject to frequent changes, and stretches seaward for a distance of more than 6 miles from the entrance points; when at its lowest level, which is about the month of April, it has sometimes not more than 3 feet at low water. The depth at the highest tide over the bar at this time of year will be about 12 feet, and in the month of October, when the depth is the greatest, about 15 feet. The depth is also affected by the wind, southerly winds increasing the height of the water on the bar. (See remarks on tides, pages 394, 395.)

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General chart, 2,414 [2,682].

Vessels can be forced through the mud, which is very soft. Extensive Charts, 2,720 [2,687]  
banks of mud and sand dry at low water on the bar, and it is covered with 999 [2,388].  
fishing stakes, which extend out  $2\frac{1}{2}$  miles southward of the bar lighthouse.  
Var.  $14^{\circ}$  E.  
The channel clearest of these stakes, according to the latest information,  
was that westward of the lighthouse.

Junks laden with stones were many years ago sunk across the mouth of the river abreast West point; these have become a solid mass by the accumulation of sand and mud, with a depth of about 5 feet at low water over them. A light-vessel is moored over the middle or second sunken junk rock from the westward, and other vessels were sunk in 1893 in the same part of the channel; the only available passage is between the light-vessel and East Junk rock.

**LIGHTS.**—From a screw-pile lighthouse, painted red, on the bar of Lat.  $13^{\circ} 28' N.$   
Bangkok river, situated 4 miles S.  $\frac{1}{2}$  E. of the fort on West point, an Long.  $100^{\circ} 34' E.$   
*occulting white* light is exhibited *every twenty seconds* at an elevation of 44 feet above high water, visible in clear weather from a distance of 10 miles. The light shows for *fifteen seconds*, and is eclipsed *five seconds*.

The building, known as the Regent or Bar lighthouse, is connected by telegraph with Paknam and Bangkok.

An *occulting white* light, showing *quick single occultations*, is exhibited from a beacon, painted white, at a distance of  $2\frac{9}{10}$  miles N.  $37^{\circ}$  E. from the Bar or Regent lighthouse. Liable to be washed away.

Another *occulting white* light of similar character is shown experimentally from an outer beacon, painted black, situated S.  $32^{\circ}$  E., distant  $1\frac{1}{2}$  miles from the Bar or Regent lighthouse with the Inner light-beacon bearing N.  $17^{\circ}$  E. Liable to be washed away.

Vessels entering or leaving the river must leave this light-beacon to port in passing.

**Light-vessel.**—A *fixed red* light, visible at the distance of 5 miles, is exhibited from the light-vessel moored head and stern abreast West point over the second or mid-junk shoal. The vessel is painted red, has one mast, and carries a red ball.

**Buoys and Beacons.**—A black buoy, surmounted by a ball, is moored at the entrance of the western channel near the outer edge of the bar, in a position S.W.  $\frac{1}{2}$  W.  $2\frac{1}{2}$  miles from the Bar lighthouse. A black beacon, surmounted with staff and globe, is placed on the edge of the bank, known as Mud point, and lies N. by E.  $\frac{1}{2}$  E.  $2\frac{7}{10}$  miles from the Bar lighthouse. A black buoy, with ball top-mark, is moored  $3\frac{1}{3}$  cables eastward of the above beacon, on the west side of the channel. A red beacon surmounted with staff and triangle is placed on the east side of the main channel, situated E.  $\frac{1}{4}$  N. nearly one mile from the black beacon, and S. by W.  $\frac{3}{4}$  W. one mile from the telegraph pole with white disc on the

Charts, 2,720  
[2,687].  
999 [2,688].  
Var.  $14^{\circ}$  E.  
Lat.  $13^{\circ} 23' N.$   
Long.  $100^{\circ} 34' E.$

eastern shore; the red beacon also marks the southern side of the inner end of the eastern channel.

The middle track is marked by the two light-beacons (*see page 391*) and by a stake beacon situated about N.E.  $\frac{3}{4}$  E.  $1\frac{1}{10}$  miles from the Bar lighthouse.

In the eastern channel, much used by coasters, a white tripod beacon is placed on the south side of the track nearly opposite Klong Kau tau, and S.E.  $\frac{1}{4}$  E., distant  $2\frac{1}{2}$  miles from the telegraph post at Klong Lampuri. At W.  $\frac{3}{4}$  N.,  $1\frac{1}{2}$  miles from this beacon there is another beacon, also painted white.

**Caution.**—Owing to frequent changes in the depths, the positions of the beacons and buoys are constantly being altered. Vessels should not attempt to cross the bar without local assistance or personal examination of the channel.

**Pilots.**—Pilot boats having European pilots on board, cruise between Koh Luem and the bar of Bangkok river. There is generally a pilot boat at anchor outside the bar fairway, its position in September 1904 was in a depth of  $3\frac{1}{2}$  fathoms, S.  $28^{\circ}$  E.  $2\frac{1}{10}$  miles from the lighthouse. It has one mast, is painted white, carries a *bright white* light at night, and shows a flare-up at short intervals. The pilot flag is red and white horizontal.

**Anchorage.**—During the south-west monsoon the anchorage recommended off the bar is in  $4\frac{1}{2}$  fathoms, with the Bar lighthouse bearing about N. by E.  $\frac{1}{4}$  E., distant  $3\frac{1}{2}$  miles; the anchorage during the north-east monsoon is about 4 miles farther eastward in 5 fathoms, with the same lighthouse bearing N.W.  $\frac{1}{2}$  W., distant  $4\frac{1}{2}$  miles. This position is convenient for boarding vessels entering the river, by which is nearly the only means of communicating with Bangkok.

**Tidal signals.**—Upon flag L, Commercial Code, being hoisted by a vessel asking for the depth of water on the bar, the following signals, in the same code, are made from the lighthouse:—

Flag.	Feet or Inches.	Flag.	Feet or Inches.	Flag.	Feet or Inches.	Flag.	Feet or Inches.
S	1	B	5	M	9	N	13
J	2	C	6	Siamese flag. T	10	V	14
H	3	R	7		11	—	—
K	4	P	8	W	12	—	—

The upper flag indicates the number of feet; the lower flag the number of inches. The depths are given for the bar of the Western channel.

**Directions.**—The west point of entrance to Bangkok river has a chart [2,087],  
clump of trees, the tops of which are about 30 feet above the surrounding [2,688].  
mangroves. Southward of the trees is a fort visible at the distance of Var. 11° E.  
about 7 miles. The trees will usually be the first object seen from the Lat. 13° 23' N.  
offing; in hazy weather the Bar lighthouse or the pilot boat outside the Long. 100° 34' E.  
bar will be the only marks visible.

Approaching Bangkok river, West point should be brought to bear about N. by E., and steered for on that bearing until the Bar lighthouse bears N.N.E.  $\frac{1}{2}$  E., which position is outside the bar in a depth of about 3½ fathoms at low water. The services of a pilot should be obtained on a first visit, or until the channel is known (see Caution, page 392). The lighthouse keeper will signal the depth of water on the bar in answer to letter L of the Commercial Code (see page 392). The bar should be crossed with a good head of steam, and the boiler feeds kept closed as much as possible. The flood streams sets to the westward or across the bar channel. (See Tides, page 394.)

If intending to enter the river by the western track, and depth of water admits, the course for West point, as above, may be continued until the lighthouse bears about East, distant a good mile, when a course about N.E.  $\frac{1}{2}$  N., heading for the telegraph post, with white disc, on the eastern bank near Klong Lampuri, allowing perhaps half a point more to the eastward if the flood is running, should be steered, passing southward and eastward of the black beacon, with staff and globe, and the black buoy eastward of it, moored about 2 miles south-eastward of West point, and north-westward of the white light-beacon. When West point fort bears N.W.  $\frac{1}{2}$  W. and is open northward of the buoy, haul round for the centre of the entrance of the river, steering for the light-vessel when it bears N.W.; pass close eastward of the light-vessel, as the channel eastward of East Junk rock is blocked. Thence to Bangkok the points of the river should be given a wide berth, and the bends followed as is usual in most rivers; the navigation is easy, but fishing stakes are numerous.

The middle track over the bar, though much encumbered with fishing stakes, appears now to be generally used; in 1904 it had 10 inches more water than was found in the western channel, but the bottom is sandy and hard, whereas in the other it is everywhere of mud. The track in appears to pass a short distance eastward of the outer light-beacon (black) and then run in a N. by E. direction to a position about midway between the inner bar buoy off Mud point, and the inner light-beacon (white) about three-quarters of a mile south-eastward therefrom; thence proceed as directed by Western track.

Chart. 999 [2,689].  
Var. 11° E.  
Lat. 13° 23' N.  
Long. 100° 34' E.

**Caution.**—Approaching the bar of Bangkok river from the southward, in the north-east monsoon, it will be necessary when near the head of the gulf to allow for a westerly current which occasionally runs with considerable strength along the edge of the bank; sailing vessels set to leeward by it have found difficulty in gaining the anchorage.

**Tides.\***—It is high water, full and change, at Bangkok river bar at 7h. 40m., but this is subject to a large correction, the greater part of which varies with the moon's declination, the result being that the time of high water at new and full moon fluctuates between after 5h. and before 10h.

Springs rise (higher tide) 11 feet, neaps (higher tide) 9 feet, the tides being usually higher in winter than in summer, but the extreme annual difference between the highest and lowest spring higher high waters does not appear to be more than one foot.

There is a large diurnal inequality of both time and height. The a.m. tides are the higher from October to March, or with the sun's declination south, and the p.m. tides the higher from April to September. There are usually two tides in the day, but when the moon's transit is between 2h. and 5h. the inferior tide often disappears, the result then being that there is only one tide at that period, the a.m. high water between October and March and the p.m. high water between April and September.

The springs, or highest semi-menstrual tides, do not happen at new or full moon, but appear to occur, according to the time of year, with the moon in certain declinational positions, as follows:—

- |                     |   |   |
|---------------------|---|---|
| January and July    | - | Preceding or at the maximum N. or S. declination.           |
| February and August | - | Following the maximum N. or S. declination.                 |
| March and September | - | Before moon reaches the equator, uncertain in these months. |
| April and October   | - | With the moon near the equator.                             |
| May and November    | - | After moon leaves the equator.                              |
| June and December   | - | Preceding the maximum N. or S. declination.                 |

#### Mean lunital intervals.

Hours of Moon's Transit.												
0	1	2	3	4	5	6	7	8	9	10	11	
h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	
7 40	7 25	7 20	7 45	8 30	9 0	9 10	9 5	8 55	8 40	8 20	8 5	

\* Analysis of four years' observations of times and heights of high water at Bangkok river bar taken from tides recorded in Navigating Officer's Remark Book, H.M.S. *Swift*, 1884.

Abstract diagrams for years 1884 and 1887 plotted in Hydrographic Office, Admiralty.

General chart, 2,414 [2,682].

## Correction to high-water times for moon's declination.

Charts, 999  
[2,688].  
2,720 [2,687].  
Var. 11° E.  
Lat. 13° 23' N.  
Long. 100° 34' E.

(Going north.)				North.				Moon's Declination. (Going south.)				South.				(Going north.)			
0	7°	14°	21°	28°	21°	14°	7°	0	7°	14°	21°	28°	21°	14°	7°				

## Correction to time of tide following moon's superior transit.

m. 60+	m. 90+	m. 125+	m. 135+	m. 100+	m. 45+	m. 5-	m. 45-	m. 85-	m. 120-	m. 140-	m. 125-	m. 90-	m. 55-	m. 15-	m. 20+
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## Correction to time of tide following moon's inferior transit.

m. 110-	m. 125-	m. 100-	m. 75-	m. 40-	m. 10-	m. 20+	m. 55+	m. 80+	m. 105+	m. 125+	m. 105+	m. 60+	m. 20+	m. 20-	m. 75-
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**To find approximately the time of high water.**—To the time of moon's transit, add lunitald interval for that transit, and take out moon's declination for resulting time, to which last apply the correction for the moon's declination as given above, distinguishing between the tides following the moon's superior and inferior transits. The result will be approximately the time of high water.

**NOTE.**—If the maximum declination is less than 28°, then the correction for declination at its maximum is the mean of that under the two declinations of that amount, on either side of 28°. For example, if 21° N. be the maximum declination, then the time correction at that maximum is the mean of 135 m. + and 45 m. + = 90 m. +.

**Tidal streams.**—Outside the bar and near the anchorage the flood sets to the westward, and the ebb to the eastward, altering its direction according to the strength of the river stream. Along the eastern shore of the gulf towards cape Liant the ebb sets to the southward and flood to the northward.

**At Bangkok** the time of high water is about 3 hours later than at the bar. The range of tide in April is from 8 to 9 feet; towards the end of the rainy season (the beginning of October) when the river is much swollen, with its banks frequently flooded and the country inundated, the range at springs is only about 4 feet.

Owing to freshets, vessels rarely swing to the flood off Bangkok during the months of September to December inclusive.

**Weather.**—At the bar anchorage, in the south-west monsoon season, the wind is from S.W., to S. by E., seldom being westward of

Charts, 909  
[2,688].  
2,720 [2,687].  
Var. 11° E.

S.W. never blowing very hard, but occasionally a puff from the N.W. There is a choppy sea at times, rendering the hoisting up of boats somewhat risky. It is pretty safe to prepare for rain (July) at this season in the evening. Clouds generally gather between 4 and 5 p.m., often setting to windward and the rain preceded by a puff of wind comes down in torrents, accompanied by lightning and thunder. In January, the north-east monsoon period, the wind was as frequently from S.W. as from N.E., light with occasional calms and fine weather. (See Weather, page 398, and table on page 561.)

Lat. 13° 38' N.  
Long. 100° 34' E.

**Above the Bar.—Paknam.**—At about 3 miles within the entrance, on the eastern bank, is Paknam, where vessels arriving have to stop to take on board a custom-house officer. Here is a fair market, from which vessels remaining at the bar anchorage can obtain their daily supplies of fresh food. Opposite Paknam are two islets; on the southern one is a fort. A telegraph cable connects Paknam with the southern islet; it is marked at each end by a post and white disc; vessels are prohibited from anchoring within half a cable of it.

Paknam is connected with Bangkok by railway and telegraph, and has a population of 6,000 to 7,000.

**Canal.—Paklat Lang,** on the western bank of the river, 5 miles above Paknam, is situated at the entrance to a canal which saves a circuit of nearly 10 miles to boats proceeding to or from Bangkok; vessels must take the circuitous route by the river. The entrance is marked by a guard-house on each side, and its vicinity may be known by its church and a long range of unarmed batteries half a mile above on the same side of the river. The canal re-enters the river alongside some floating houses at the small village of Paklat Bon, near Upper Paklat.

This canal is closed during the rains in order to avoid injury by the freshets.

Paklat Lang has a population of about 7,000.

Above Paklat Lang, is seen successively upon the eastern bank the first group of petroleum reservoirs with a large wharf, and a large cleared space on a portion of which is Bang Chak railway station. Some distance above is a second group of petroleum reservoirs, and 1½ miles beyond on the western bank the chimneys of the rice and saw mills are conspicuous. Fine trees line the river banks, &c., in the lower portion of the river.

Lat. 13° 45' N.  
Long. 100° 28' E.

**BANGKOK,** the capital and seat of commerce of the kingdom of Siam, is 25 miles above the entrance points following the river course, or about 14 miles direct. The west bank is chiefly occupied by Siamese, Chinese, and Mahomedan residents. The bulk of the business is transacted on the east side.

General chart, 2,414 [2,682].

On the east bank of the river is the city proper, occupying a space about 3 miles in length by the same in breadth, traversed by canals, and surrounded by battlements flanked by towers in places. Here are the Royal palaces, the foreign warehouses, the consulates, the principal rice mills, and most of the public offices. A road known as the Charum Krung extends from the palace walls to Bangkok, and the electric railway runs along it and other roads for a distance of about 11 miles. The principal buildings include the British church, a Roman Catholic cathedral, several missionary chapels, two hospitals, &c. The King's palace and the temples are magnificent and on a large scale, the architecture being of a kind peculiar to the country. Tramways were introduced in 1888, and the principal streets and houses are lighted by electricity. A considerable portion of the river banks above the city are lined with floating houses, over which can be seen thick clusters of wooden houses built on piles.

Charts, 399  
[2,688].  
2,730 [2,687].  
Var. 14° E.  
Lat. 13° 45' N.  
Long. 100° 28' E.

**Population.**—The city of Bangkok has a population of about 350,000 inhabitants.

**Trade.**—The principal exports are rice, teak, pepper, fish, sapan wood, and bullocks; the imports are treasure, gold leaf, cotton goods, cotton yarn, opium, silks, gunny bags, kerosene, hardware, &c.

The aggregate value of exports in 1904 was 5,650,175*l.*, the value of rice alone being 4,520,470*l.*; and the imports, 4,363,966*l.*

Rice is produced in immense quantities, not only from the innumerable fields which line the fertile valley of the Menam, but from the adjacent rivers which flow into the gulf from the enormous watershed of the mountain crescent which fringes the northern extremity of the kingdom.

There are 26 steam rice mills in Bangkok.

**Shipping.**—The number of vessels that entered the port in 1904 was 738 of 664,368 tons, of these 140 were British vessels aggregating 126,736 tons. Only 3 sailing vessels were included in the above. Vessels above 12 or 13 feet draught complete their cargoes at Koh Si Chang, 20 miles south-east of the bar. (See remarks on bar, page 390.)

**Anchorage.**—The widest and best place to anchor is 1½ miles below the British Legation, as above this the river is much encumbered with shipping and lighters. All vessels are obliged to moor unless made fast to a wharf or landing place. H.M. vessels usually moor off the British Legation. A quantity of floating matter is brought down by the freshets in the rainy season, and the currents run from 4 to 5 knots at times.

Vessels are not allowed to proceed above Klong Tapanhan without special permission.

**Mails.**—Communication is maintained with Singapore and Hong Kong by several lines of steam-vessels; the North German Lloyd

Charts, 909  
[2,688].  
2,720 [2,687].  
Var. 1° E.  
Lat. 13° 45' N.  
Long. 100° 28' E.

Company's steamers maintain a regular communication with Hong Kong. Other lines call here.

**Telegraph.**—Bangkok is in telegraphic communication (office always open) with Singapore and the rest of the world. Telegraph lines have been completed to the total length of 2,900 miles, and Bangkok is now connected with Korat, Nong-Khai, Sesopone, Chentabun, Bangtaphan, and Chiengmai; with Moulmein, and Tavoy in Lower Burma; and with Saigon in Annam; also with Penang. Koh Si Chang is connected by a submarine cable to the mainland.

**Railway.**—A railway runs from Bangkok to Khorat, 165 miles, whence it is being extended northwards; from Ayuthia (on the above line) a branch has been completed about 30 miles beyond Lopburi and will be prolonged northward to Paknampo, and ultimately to Chiengmai. Lines also run from Bangkok to Pechaburi, 95 miles; to Tachin, 20 miles; and to Paknam at the mouth of the river, 20 miles. A railway is under construction from Bangkok, via Patreu, to Bang Pra; other lines and extensions are projected.

**Supplies.—Coal.**—Coal can be obtained from the Borneo Company and one or two German firms. About 500 tons are kept in stock by the first-named company, and the same quantity by Markwald & Co. Steamers are coaled in mid-stream from cargo boats, or at the jetty, 265 feet in length, where there is usually about 12 to 17 feet water at low tide. If a steamer is coaled outside the bar, or at Koh si Chang or Ang Hin, each distant about 20 miles south-eastward from the bar, an additional charge for lighterage is made. Fresh provisions and other supplies are abundant.

**Docks.**—The Government dock at Bangkok is 275 feet in length on blocks, 60 feet wide, with 12½ feet on sill at high water ordinary springs, and takes a vessel of 3,000 tons displacement. There is a crane at the dockyard capable of lifting 30 tons, and workshops, &c. for repairs to government vessels.

No. 1 dock can take a vessel of 1,200 tons. Its entrance is 40 yards from the river, with a spacious jetty, alongside which vessels can be taken at any state of the tide. Largest vessel docked, 257 feet in length, 36 feet beam, 11 feet draught. There are also machine and moulding shops well supplied with the necessary machinery for repairing steamers up to 1,200 tons, and a pair of shears capable of lifting 20 tons.

There is in addition a smaller dock, with 7½ feet over the sill at high water, and also several mud docks.

**WEATHER.**—The following are the results of 10 years observations by Staff-Surgeon J. Campbell, R.N., taken at Bangkok in the years 1858-68, omitting 1862. (See also Weather Table, page 561.)

**Winds.**—At Bangkok, early in October, northerly breezes set in, varying towards west and east, and during this month, or early in November, the north-east monsoon is established. Throughout December it continues strong, but in January it has lost half its force, and in February retains only one-fifth of its original strength, the deficiency being partly made up by winds from S.S.E. to S.W. By the end of this month, or early in March, the northerly winds have ceased, and strong breezes from South and S.S.W. prevail.

During the months of May, June, July and August, south-westerly winds are strong, constant, and sometimes boisterous, the direction being chiefly South to S.S.W. until June, and thence S.W. until September, when light variable winds are the rule and foretell a breaking-up of the south-west monsoon.

**Climate.**—Cholera and dysentery are prevalent, and the use of the river water for drinking purposes should be avoided. There is a general hospital at Bangkok to which sailors are admitted.

**Quarantine station.**—See page 386.

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General chart, 2,414 [2,682].

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Charts, 990  
[2,688].  
2,720 [2,687].  
Var. 1° E.  
Lat. 13° 45' N.  
Long. 100° 28' E.

Company's steamers maintain a regular communication with Hong Kong. Other lines call here.

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**Climate.**—Cholera and dysentery are prevalent, and the use of the river water for drinking purposes should be avoided. There is a general hospital at Bangkok to which sailors are admitted.

**Quarantine station.**—*See page 386.*

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General chart, 2,414 [2,682].

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## CHAPTER XII.

### COASTS OF COCHIN CHINA AND ANNAM.—CAMBODIA POINT TO HUÉ RIVER.

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Chart, 2,414  
[2,682].

**LOWER COCHIN CHINA.—General remarks.—**

**Inland navigation.**—We have not here entered into a description of the numerous rivers and streams which in every direction intersect the interior of Lower Cochinchina; such would be out of place in this work. Some of them are quite deep enough for the passage of gun-boats, and all, or nearly all, are navigable for the native craft by which the commerce of the country is carried on; the following are the most important:—The Vaiko, eastern branch, which runs from the north to the south, westward of and parallel to the Saigon arm of the Don nai, is deep, and easily navigated. The Vaiko, western branch, which runs parallel to the lower part of the Mekong river, and joins the Vaiko, eastern branch, the latter joins the Loirap mouth of Saigon river. The great commercial canal which unites Mitho to the western branch of the Vaiko river and to Saigon, and also to the numerous affluents of the Don nai. The commercial canal which connects Mekong river with Lower Cochinchina and the Don nai. The canal d'Avalanche, which is immediately northward of Saigon. The Rach mongom, the Rach tach bai, and the Rach ba bu, which afford easy means of communication between Saigon and Baria; and the Don kiang, the Tai kiang, &c., which connect Saigon with Bien Hoa, &c. Most of the trade passes through the numerous waterways to Saigon; the Messageries Fluviales Co. and others afford rapid transit. *See also* the following pages on the Mekong.

The coast of Lower Cochinchina, from Cambodia or Kamao point, its south-western extreme, to Saigon river is low land, inundated by the sea at times, and in most parts the tops of the trees are only just visible at the distance of 11 or 12 miles. The whole coast is fronted with shallow banks of sand, which project 10 or 12 miles in places, having from one to 3 fathoms on them, and 6 to 10 fathoms near their edges. The depths are regular in the offing, decreasing gradually towards these banks, over a bottom mostly of fine sand and ooze.

As this coast is very low and destitute of any particular marks, vessels coming from the westward and going to cape St. James, ought to be

careful to avoid it; after sighting Pulo Obi they should make for the Brothers and Pulo Condore, and from the meridian of this latter group steer a course for cape St. James.

Royalist bank, south-eastward of Pulo Obi, and a 6-fathoms bank 20 miles E. by N. & N. from it, are described on page 365.

**MEKONG or CAMBODIA RIVER,** takes its source in the mountains of Thibet, traverses the Chinese province of Yun nan, the western frontiers of Tong King and Annam, and enters Cambodia between Prea patang and Kratie. A little southward it turns abruptly westward and thence south-westward, where it divides into three branches near Pnom penh or Nam van, the ancient capital of Cambodia\* ; two of these branches flow through Lower Cochin China.

\*Lat. 11° 30' N.  
Long. 104° 54' E.

The first branch turns to the north-westward, and passing Udon, a royal residence, goes to supply a large lake, nearly 60 miles in extent, about 6 or 7 miles north of which, up a small river, are the extensive ruins of the ancient city of Angkor. The waters run into this lake during the south-west monsoon, the rainy season, and discharge into the Mekong in the opposite season.

The second branch is the Batak or Hau, the western of the two large rivers running through Lower Cochin China. It takes from Pnom penh a south-south-east direction, watering the provinces of An giang, and Viuh Long, of which it forms the western limit. At the city of An giang or Chaudok\* it communicates with the gulf of Siam at Hatien by the Vinh te or Hatien canal, and with the Tien river, the eastern branch, by the Vam nao canal. From An giang the river follows a south-easterly direction, discharging itself into the sea by a mouth divided by islands into three channels, namely, the Kua Ba tak, Kua Din an, and Kua Tranh Dé.

\*Lat. 10° 43' N.  
Long. 105° 5' E.

The third branch is the Tien, the eastern of the two rivers which flow through Lower Cochin China. From Pnom penh it makes its way towards the sea parallel to the course of the Hau, and bounds the province of Mitho on the west. At Vinh Long,\* a branch diverges from the main stream, and falls into the sea by two mouths, named Kua Kong hau and Kua Ko khien. A few miles farther eastward two other rivers, the Ham long and the Ba lai, branch off from the main stream; the mouth of the first is named the Ben nhau, that of the second the Ba lai. The main stream flows on past the city of Mitho, and finally enters the sea by two mouths named Kua dai and Kua tieu.

\*Lat. 10° 17' N.  
Long. 105° 58' E.

**Depths in the entrances.**—The principal mouths have from 7 to 10 feet at low water over their bars; springs rise from 10 to 12 feet. The Kua tieu, page 404, is the one generally used. Above the bars the depths increase considerably in most of them, but the rivers can only be

## CHAPTER XII.

### COASTS OF COCHIN CHINA AND ANNAM.—CAMBODIA POINT TO HUÉ RIVER.

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Chart, 2,414  
[2,682].

**LOWER COCHIN CHINA.—General remarks.—**

**Inland navigation.**—We have not here entered into a description of the numerous rivers and streams which in every direction intersect the interior of Lower Cochinchina; such would be out of place in this work. Some of them are quite deep enough for the passage of gun-boats, and all, or nearly all, are navigable for the native craft by which the commerce of the country is carried on; the following are the most important:—The Vaiko, eastern branch, which runs from the north to the south, westward of and parallel to the Saigon arm of the Don nai, is deep, and easily navigated. The Vaiko, western branch, which runs parallel to the lower part of the Mekong river, and joins the Vaiko, eastern branch, the latter joins the Loirap mouth of Saigon river. The great commercial canal which unites Mitho to the western branch of the Vaiko river and to Saigon, and also to the numerous affluents of the Don nai. The commercial canal which connects Mekong river with Lower Cochinchina and the Don nai. The canal d'Avalanche, which is immediately northward of Saigon. The Rach mongom, the Rach tach bai, and the Rach ba bu, which afford easy means of communication between Saigon and Baria; and the Don kiang, the Tai kiang, &c., which connect Saigon with Bien Hoa, &c. Most of the trade passes through the numerous waterways to Saigon; the Messageries Fluviales Co. and others afford rapid transit. *See also* the following pages on the Mekong.

The coast of Lower Cochinchina, from Cambodia or Kamáo point, its south-western extreme, to Saigon river is low land, inundated by the sea at times, and in most parts the tops of the trees are only just visible at the distance of 11 or 12 miles. The whole coast is fringed with shallow banks of sand, which project 10 or 12 miles in places, having from one to 3 fathoms on them, and 6 to 10 fathoms near their edges. The depths are regular in the offing, decreasing gradually towards these banks, over a bottom mostly of fine sand and ooze.

As this coast is very low and destitute of any particular marks, vessels coming from the westward and going to cape St. James, ought to be

careful to avoid it; after sighting Pulo Obi they should make for the Brothers and Pulo Condore, and from the meridian of this latter group steer a course for cape St. James.

Charts, 2,414  
[2,682].  
1,016 [3,151].  
1,261 [2,697].  
1,269 [3,698].

Royalist bank, south-eastward of Pulo Obi, and a 6-fathoms bank 20 miles E. by N.  $\frac{1}{2}$  N. from it, are described on page 365.

**MEKONG or CAMBODIA RIVER,** takes its source in the mountains of Thibet, traverses the Chinese province of Yun nan, the western frontiers of Tong King and Annam, and enters Cambodia between Prea patang and Kratie. A little southward it turns abruptly westward and thence south-westward, where it divides into three branches near Pnom penh or Nam van, the ancient capital of Cambodia\*; two of these branches flow through Lower Cochinchina.  
\*Lat. 11° 36' N.  
Long. 104° 51' E.

The first branch turns to the north-westward, and passing Udon, a royal residence, goes to supply a large lake, nearly 60 miles in extent, about 6 or 7 miles north of which, up a small river, are the extensive ruins of the ancient city of Angkor. The waters run into this lake during the south-west monsoon, the rainy season, and discharge into the Mekong in the opposite season.

The second branch is the Batak or Hau, the western of the two large rivers running through Lower Cochinchina. It takes from Pnom penh a south-south-east direction, watering the provinces of An giang, and Viuh Long, of which it forms the western limit. At the city of An giang or Chaudok\* it communicates with the gulf of Siam at Hatien by the Vinh te or Hatien canal, and with the Tien river, the eastern branch, by the Vam nao canal. From An giang the river follows a south-easterly direction, discharging itself into the sea by a mouth divided by islands into three channels, namely, the Kua Ba tak, Kua Din an, and Kua Tranh Dé.

\*Lat. 10° 43' N.  
Long. 105° 5' E.

The third branch is the Tien, the eastern of the two rivers which flow through Lower Cochinchina. From Pnom penh it makes its way towards the sea parallel to the course of the Hau, and bounds the province of Mitho on the west. At Vinh Long,\* a branch diverges from the main stream, and falls into the sea by two mouths, named Kua Kong hau and Kua Ko khien. A few miles farther eastward two other rivers, the Ham long and the Ba lai, branch off from the main stream; the mouth of the first is named the Ben nhau, that of the second the Ba lai. The main stream flows on past the city of Mitho, and finally enters the sea by two mouths named Kua dai and Kua tieu.

\*Lat. 10° 17' N.  
Long. 105° 58' E.

**Depths in the entrances.**—The principal mouths have from 7 to 10 feet at low water over their bars; springs rise from 10 to 12 feet. The Kua tieu, page 404, is the one generally used. Above the bars the depths increase considerably in most of them, but the rivers can only be

Charts, 2,414  
[2,682].  
1,016 [3,151].  
1,281 [2,697].  
1,269 [2,698].

navigated by those acquainted. The ebb stream in the rainy season attains a rate of 3 to 4 knots, and a quantity of floating matter is brought down by it; at other times the velocity is from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  knots at springs, the ebb being stronger than the flood.

**Inland navigation.—Height of river.**—The water in this great river commences to rise in the month of May, attains its maximum in October, whence it decreases until March. The rise is 17 feet at Chaudok, about 100 miles from its mouth, and 26 to 33 feet at Pnom penh, about 70 miles above. Tides are only felt during the season when the waters are low, the rise being about one foot at Pnom penh, and nearly  $4\frac{1}{2}$  feet at Chaudok.

Lat.  $12^{\circ} 30' N.$ .  
Long.  $106^{\circ} 0' E.$

At Kratie (near Pasop), about 100 miles above Pnom penh, or 270 miles from the sea, the water attains a first maximum in August, a second in September, thence falling until April. It is anticipated that with the removal of some obstructions a vessel of 3 feet draught, with a speed of 12 knots, in charge of a competent pilot, may ascend as far as the Stung Treng at low river. (*Revue Français*, December 1898.)

The Stung Treng, lat.  $13^{\circ} 32' N.$ , about 420 miles up, is a large tributary of the Mekong, and much influences the rise of the water in the Mekong. Near, apparently below, are the Prea patang rapids, through which there is reported to be a deep channel.

Between Pakmun and Kemarat, 50 miles apart, the latter about 600 miles up, there are no less than 28 rapids; these rapids are impracticable from January to May at low river, and risky from mid-August to mid-October, high river, when the current is very strong; at other times they are practicable for vessels of about 2 feet draft. The gun-boat *Massie* took six days to do these 50 miles. This vessel, drawing 2 feet, and accompanied by the *Grandière*, both upper Mekong gun-boats, ascended to Vien Tian, about 300 miles above Kemarat, and thence to Luang Phrabang (lat.  $18^{\circ} N.$ ), 250 miles beyond, and nearly 1,200 miles from the sea, reaching the latter place early in September, in about 14 days from Vien Tian.

The rise of river at Vien Tian is about 40 feet, and at Luang Phrabang 50 feet. A vessel has navigated the Mekong from Saiga to Vien Tian, but the size is not stated. (*Courrier de Haiphong*, 1904.)

This portion is considered navigable by craft of about 2 feet draught to Keng Luong, 60 miles below Luang Phrabang, for about 3 months, or when the water is 20 feet above low river at Vien Tian, though the navigation is considered dangerous a week or more on either side of high river, as the current is violent. There are numerous rapids in this portion, beginning about 15 miles above Vien Tian.

The Consular Report for the year 1897 states :—

"The river is open for navigation all the year up to Khone where at high river it is barred by rapids. The river between Khone and Kong, about lat.  $14^{\circ}$  N., for an altogether contrary reason, is impracticable during the dry season even for small launches. From Bandong, a village on the upper side of the island of Kong, the river is navigable at all times for steamers of  $2\frac{1}{2}$  feet draught to the northern limit of the province."

There is a light railway across Kong island, 4 miles in length, on which two small steamers were transported to the river above; the gauge has since been reduced to one suited to ordinary traffic.

**The Capital.**—**Pnom penh**, the capital of Cambodia and seat of Government, is about 170 miles above the entrance of the Mekong. French functionaries have charge of the treasury, the administration of justice, customs, &c. The capital has been considerably improved under the present rule, roads have been made, and sanitary works carried out. The new treasury is the most remarkable building. Population about 39,000. The trade passes through Saigon. Easy communication is afforded with the principal towns in the interior by light-draught steamers. A land telegraph wire connects it with Bangkok and Tavoy (Burma).

**Vinh Long**, one of the prettiest stations of Cochin China, is 23 miles above Mitho, page 405, or 48 miles from the sea. It is in daily communication with Mitho and Saigon by steam launches and vessels of the Messageries Fluviales. The climate is said to be healthy, and all sorts of supplies are obtainable. It has a fine church, telegraph office, schools, good roads, &c.

**DELTA of the Mekong or Cambodia river.**—The several mouths of the Cambodia river form a delta more than 60 miles in extent, in a north-east and south-west direction. The land is low, and subject to frequent changes in consequence of the accumulation of the alluvial deposit brought down by the different branches of the river. Shallow banks front the whole delta, and extend so far to seaward that the land is in places invisible from their outer edges. The 5-fathoms line of soundings bounding these banks is from 10 to 12 miles off shore. The depths near its edge decrease suddenly from about 10 to 3 fathoms.

**Caution.**—Many vessels have gone on shore off this delta, on account of the rapid decrease of the depth and the absence of landmarks. It is therefore necessary in approaching to exercise the greatest caution when navigating westward of the line of cape St. James bearing N. by E.  $\frac{1}{2}$  E. At the first cast under 11 fathoms, it is necessary to haul out, especially during the north-east monsoon, when the current sets strong south-westward on to the banks, and over which there is then a

Charts, 2,414  
[2,682].  
1,016 [3,151].  
1,261 [2,097].  
1,269 [2,698].  
Var.  $2^{\circ}$  E.

Lat.  $11^{\circ} 38' N.$   
Long.  $104^{\circ} 54' E.$

Lat.  $10^{\circ} 15' N.$   
Long.  $105^{\circ} 59' E.$

Charts, 2,414  
[2,32]  
1,013 [3,151]  
1,261 [2,697]  
1,269 [2,698]  
Var. 2° E.

considerable sea. The direction of the current varies from W.S.W. to S.S.W., and its rate, which depends a great deal upon the force of the wind, is sometimes as much as 40 or 50 miles per day. Near the delta the rate of this current increases with the flood and diminishes with the ebb.

The water from the delta is charged with mud, and discoloured water may at times be seen 7 or 8 miles out at sea towards the end of the ebb.

The mouths of the rivers are only available with local knowledge.

Lat. 9° 20' N.  
Long. 106° 20' E.

**The Tranh Dé, Batak, and Dinan** are the three channels in the western mouth of the Mekong river. The shallow banks fronting them extend about 9 or 10 miles off shore, and are for the most part uncovered at low water; there is a patch, over which there is only 4 feet water, 9 miles off the mouth of the Dinan. Upon the bar of the Dinan there was formerly a depth of about 10 feet at low water spring tides; neither it nor the Batak are now navigable, but the Tranh Dé, the western channel, is available for small craft.

**The Kong hau and Ko khien** are about 20 miles farther north-eastward and have a common entrance; the shallow banks fronting them extend 10 or 11 miles off, and partly uncover; upon the bar fronting the entrance the depth is about 6 feet at low-water springs. There is a clump of trees on the right bank of the Kong hau, and a fort on the left bank at the outer end of the island which separates it from the entrance of the Ko khien.

Lat. 9° 58' N.  
Long. 106° 48' E.

**The Ben Nhau** mouth, about 8 miles north-eastward, appears to be more accessible; there is about 7 or 8 feet on the bar at low water springs, but the channel is tortuous. There is a fort upon each point of the entrance.

A few miles farther to the north-eastward is the entrance of the Ba lai, which is only available for very light craft.

**The Kua dai** has about 7 feet on its bar at low water springs, between banks which extend about 11 miles seaward of it; a short distance up there is a fort on either side; this mouth, though navigable, is but little used.

**The Kua tieu**, the northernmost mouth of the Mekong, is the one used by vessels ascending to Mitho, &c. On the bar there is a depth of 7 or 8 feet, at low water springs. Shallow banks front the entrance to a distance of 12 miles, the edges of which are usually marked by breakers. Fishing stakes are numerous all over these banks. There are forts on both sides of the entrance.

**LIGHTS.**—On Mirador point, northern side of entrance to the Kua tieu, a *fixed red* light is exhibited from a small iron tower at an elevation of 33 feet above high water, visible at the distance of one mile.

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General chart, 2,660a [2,678].

From a tower on piles, erected on the bank on the north side of approach, at  $2\frac{3}{4}$  miles E. by S.  $\frac{3}{4}$  S. from the above, is exhibited at an elevation of 90 feet above high water, a *fixed* light showing red between the bearings of S.  $41^{\circ}$  W. and S.  $62^{\circ}$  W., and from N.  $85^{\circ}$  W. to N.  $49^{\circ}$  W.; *white* in all other directions. It is visible from a distance of 15 miles in clear weather.

**Beacon.**—A beacon surmounted by a ball, painted black, marks the southern edge of the bank on the north side of the entrance to the Kua tieu; it is situated  $2\frac{1}{2}$  cables seaward of the outer light, and E. by S.  $\frac{3}{4}$  S. 2 miles from the light-structure on Mirador point.

**Buoys.**—A sphero-conical buoy, named Nopodom, painted in black and white horizontal bands and surmounted by a black top-mark, is moored on the eastern edge of the shallow bank extending to the eastward, north of the entrance to the Kua tieu; it lies with the fort on the northern point of the entrance to the river bearing W.  $\frac{5}{8}$  N., distant  $8\frac{3}{4}$  miles.

A conical buoy with a conical top-mark, painted red, is moored near the Francis Garnier rock, situated S.E. by E.  $\frac{1}{4}$  E. one mile from the above-mentioned fort.

**Directions.**—Vessels should not enter the Kua tieu without a pilot. Within the entrance points the navigation is said to be easy; the left bank is followed at the distance of half a cable until abreast Rach Kahon, thence kept close aboard until Mitho is reached.

**Mitho.**—The town and citadel of Mitho is situated about 25 miles above the entrance to the Kua tieu. It is connected by railway with Saigon.

**Tides.**—It is high water, full and change, at Mitho road at 3h. 50m.; springs rise 11 feet, neaps 7 feet.

**Caution.**—In front of the mouths Kua dai, Kua tieu, the Loirap (Soirap), page 406, and the coast to Kangio point, shallow water extends about 12 miles off in places, and limits on the west the channel leading to Saigon; its edge is fairly shelving and may apparently be approached by the lead into 5 or 6 fathoms, but cape St. James light should not be brought to bear eastward of N.N.E.  $\frac{1}{2}$  E.

**SAIGON or DON NAI RIVER.—The Delta.**—North-eastward of the mouths of the Mekong, between the Kua tieu and cape St. James, 17 miles apart, is a large bay within which is the delta of the Saigon, Don nai, or Fuok Binh Kiang.

Numerous islands covering a space about 15 miles in length by the same in breadth, with many rivers or channels between them, form the delta; about five of these rivers lead to the sea, namely, the Loirap and Kua Dong westward of Kangio point, and the Fuok Binh Kiang, the Song

Charts, 1,261  
[2,697].  
1,016 [3,151].  
1,269 [2,699].  
Lat.  $10^{\circ} 15' N.$   
Long.  $100^{\circ} 47\frac{1}{2}' E.$   
Var.  $2^{\circ}$  E.

Plan on chart,  
1,269 [2,699].  
Lat.  $10^{\circ} 22' N.$   
Long.  $106^{\circ} 21' E.$

Charts, 1,261  
[2,697].  
1,016 [3,151].  
1,269 [2,698].  
Var. 2° E.

Viam Cheu, and the Song Viam Kai mep between Kangio point and cape St. James. Above Fa mi point they form one stream. The Saigon river is probably replenished by the inundations from the Mekong, the great river of Cambodia, as nothing in the nature of the mountains of Lower Cochin China indicates the existence of what might be its proper sources. It irrigates all the northern part of the province of Bien Hoa, passes before the citadel of that name, and pursues its course to the southward. It does not become navigable until below the ancient barriers, at the point where the Tai kiang branches off 6 miles below Bien Hoa. From thence it follows a southerly direction with several windings for 15 miles, where it receives the Saigon arm and forms the Tam kiang khau, which runs nearly north and south. At Fa mi point it divides into two arms; the one turning to the westward is the Loirap, that turning to the south-eastward re-assumes the name of Fuok Binh Kiang, and discharges its waters between Kangio point and cape St. James as before mentioned.

The Saigon arm of the Don nai is its sole affluent, and, like it, is replenished by the inundations from the Mekong river. It flows from the north-westward, leaves on its right the mountain of Badinh, passes by the Kaikong, Thu dau mot, and Dai thieu, and, pursuing a serpentine course, passes Saigon, joining the Don nai about 8 or 9 miles below that city.

\*Lat. 10° 24' N.  
Long. 107° 2' E.

**Navigable depths to Saigon.**—The Fuok Binh Kiang,\* close eastward of Kangio point and fort, is the channel chiefly used; it has a depth of 23 feet in the fairway in the shallowest portion of it, namely, a coral bank that has been dredged to that depth about 23 miles above Kangio point and about 20 miles below Saigon; springs rise 12 feet.

The Messageries Maritimes steamers go up to Saigon city; the largest of these is 433 feet in length, 54 feet in breadth, 25½ feet draught of water, and 6,357 tonnage.

The main river is said to be navigable up to within 6 miles of Bien Hoa as before stated, or 15 miles above the arm that leads to Saigon.

The Loirap (or Soirap), its western branch, is the widest and most direct, and has about 19 feet at low water springs on its bar, which extends about 12 miles seaward of Second point, south side of entrance. About 5½ miles above First point there is a bar with about 16 feet at low water. At 14 miles further above it joins the Fuok Binh, abreast Fa mi point signal station.

The Kua Dong tranh, between the two rivers mentioned, has about 9 feet on its bar at low water, and there is not more than 6 feet in places below its junction with the main stream.

**The Chavia and Rach lap rivers,** eastward of the Saigon delta, discharge into Ganh Rai bay, within cape St. James, and lead to the town of Baria. The Rach lap is preferable; the depths in it being

not less than 2 fathoms at low-water spring tides. It is necessary in any case to anchor outside the narrow channel which leads from both rivers to Baria, and which is only navigable for boats. The Rach lap uniting itself to the Kua lap completely isolates the peninsula of cape St. James.

**CAPE ST. JAMES (Nui Ganh Rai)**, 620 feet in height, is the south extreme of the peninsula forming the eastern boundary of the entrance to Saigon river, and is the first high land seen when coming from the south-westward, the whole of the coast from thence to the gulf of Siam being low swampy land. The cape, with the two hills northward of it, 820 and 784 feet in height, appear as three islands when first seen at a distance of about 30 miles; *see* view A on chart No. 1,261. A small islet lies close to the south-east side of the cape. *See Light*, page 408.

**Settlement.—Sanatorium.**—Cape St. James is now the sanatorium of Cochin China, in consequence of which the town of Vang tau, situated in Cocoanut bay, has much increased in size, and supplies of provisions of all kinds are now obtainable. Drinking water, however, is scarce at present, being procurable only from the tanks. Numerous batteries have been built on the heights, and troops of Marine Artillery and Infantry are stationed there. A good coach road connects Cocoanut bay with cape Ti wan, page 416.

**Harbour.**—A harbour is being formed by a semicircular breakwater 850 yards in length, which affords shelter during the south-west monsoon to small vessels not exceeding a draught of  $8\frac{1}{2}$  feet. It begins near the telegraph battery and has a general north-north-west direction. The depth at the extremity of the breakwater will be about 11 feet at low water, and there will be about 15 feet northward of the centre. Small vessels will be able to go alongside or to anchor and haul their sterns in to the breakwater. The breakwater was partially destroyed by a typhoon in May 1904, and is covered at high water.

**LIGHTS.**—A *fixed red* light is shown on the end of the mole at Cocoanut bay, visible in clear weather from the distance of one mile.

Another *fixed red* light, elevated 82 feet above high water and visible from a distance of 4 miles, is exhibited from a white hut, North 5 cables from the Mole light. These lights in line lead in the fairway between Ranza shoal and the 5-fathoms contour-line on the western side of the channel.

**Anchorage.**—There is anchorage off the bay in about 7 fathoms, mud, with the solitary cocoanut tree in the bay bearing about East, distant one mile. The swell is heavy here during the south-west monsoon, but the anchorage is excellent in the opposite season.

**Telegraph.**—Cape St. James is the landing place of the submarine cables from Singapore, Haifong, and Hong Kong. The offices of the

Charts, 1,261  
[2,697],  
1,016 [3,151].  
1,269 [2,698].  
Var. 2° E.

Eastern (International) Telegraph Company are in Cocoanut bay. There is a semaphore station connected with Saigon by telegraph. See also page 409.

**Ganh Rai bay**, the estuary of the Saigon, is encumbered with a flat extending about 2 miles from its eastern shore, and is covered with fishing stakes; the Chavia and Rach lap, page 406, discharge into it.

**DANGERS in the approach to Saigon river.**—The bank fronting the entrances to the eastern branches of the Mekong, to the distance of about 12 miles, has been previously referred to.

**Kangio or Bassok bank** forms the western side of entrance to Saigon river. It extends  $5\frac{1}{2}$  miles south-eastward of the land south-westward of Kangio point, and dries from 3 to 4 feet in places for about  $3\frac{1}{2}$  miles off shore, with depths of less than 3 fathoms over the remainder. Its eastern edge is  $1\frac{1}{2}$  miles distant from the east point of entrance, northward of cape St. James, with a depth of 7 to 12 fathoms. The bank is covered with fishing stakes, out to the depth of 3 fathoms in places.

Lat.  $10^{\circ} 17\frac{1}{4}'$  N.  
Long.  $107^{\circ} 21'$  E.

**A patch** about half a mile in length with a least depth of  $2\frac{1}{2}$  fathoms, lies 2 miles E.S.E. of the south-east extreme of Kangio bank, within the 5-fathoms contour line, with cape St. James' lighthouse bearing N.E.  $\frac{1}{2}$  E., distant  $3\frac{1}{2}$  miles.

**Ranza shoal**, with a least depth over it of 15 feet, lies with cape St. James' lighthouse bearing N.E. by E.  $\frac{1}{2}$  E., distant 9 cables. The north point of Fausse bay opening westward of the small islet near the north point of Cocoanut bay, bearing N. by W.  $\frac{1}{4}$  W., leads close westward of the shoal, which may be recognised by the colour of the water and eddies.

**Formosa bank**, within a depth of 3 fathoms, is about a mile in length by half a mile in breadth, with a least depth of  $2\frac{1}{4}$  fathoms, situated with cape St. James' lighthouse bearing N.W. by W.  $\frac{1}{4}$  W., distant  $1\frac{1}{2}$  miles. It is composed of hard sand, with depths of  $3\frac{1}{4}$  to 5 fathoms extending nearly 2 miles east-north-eastward of it.

About  $1\frac{1}{2}$  miles south-westward and south-eastward of Formosa bank are several shoals with less than 5 fathoms; on one of these there is but  $3\frac{1}{2}$  fathoms, with cape St. James' lighthouse bearing N.W. by W.  $\frac{3}{4}$  W., distant  $3\frac{1}{4}$  miles. The lighthouse bearing N. by W., or northward of that bearing, leads westward of all these banks. The bay between cape St. James and Ti wan is shallow, the outer limit of which,  $4\frac{1}{4}$  to  $4\frac{3}{4}$  fathoms, with 6 to 8 fathoms close-to, lies S.W. about  $3\frac{1}{2}$  miles from cape Ti wan. (*Dangers eastward continued on page 416.*)

Lat.  $10^{\circ} 19' 51''$  N.  
Long.  $107^{\circ} 4' 55''$  E.

**LIGHTS.—Cape St. James.**—From a circular white tower, 26 feet high, standing on the southernmost of the heights of cape St.

James, a *fixed white* light is exhibited at an elevation of 488 feet above high water, visible in clear weather from a distance of 30 miles. Charts, 1,281 [2,697]. 1,016 [3,151]. 1,269 [2,698]. Var. 2° E.

**Kua Dong tranh.**—From a square white tower on the east point of entrance to Kua Dong tranh (between Loirap river and Kangio point), is exhibited at an elevation of 73 feet above high water, a *white* light showing *fixed* and *flashing* sectors as follows:—*Quick flashes* between the bearings of N. 54° W. and N. 13° W.; *fixed* from N. 13° W. to N. 9° E.; *quick flashes* from N. 9° E. to N. 36° E.; *fixed* from N. 36° E., through east, to S. 54° E.; obscured elsewhere. It is visible in clear weather from a distance of 14 miles.

**Kangio bank.**—A *fixed red* light, visible in clear weather from a distance of 7 miles, is exhibited at an elevation of 32 feet above high water from a pile lighthouse on the north-east edge of Kangio bank. The light is obscured over the banks on the western side of Saigon river entrance. Lat. 10° 24' N. Long. 107° 04' E.

**Fuok binh kiang.**—A *fixed white* light, elevated 33 feet above high water and visible from a distance of 7 miles, is exhibited from a pile lighthouse, close to the edge of the shallow bank on the west side of Saigon river, N.W.  $\frac{1}{2}$  W., distant 2½ miles from Kangio point.

At 7 cables N.  $\frac{3}{4}$  W. from the lighthouse there is an iron framework beacon, upper half painted white, lower half black.

**Rach Gioi.**—A *fixed green* light is shown from an iron support, 26 feet in height, 100 yards northward of the mouth of the Rach Gioi, 2½ miles above Fa mi point, visible at the distance of 7 miles.

**Don nai.**—A *fixed red* light, visible at the distance of one mile, is exhibited at the south point of the junction of the branch that leads to Saigon city. Lat. 10° 44' N. Long. 106° 45' E.

**Signal stations.**—There is a semaphore station near the lighthouse on cape St. James, in connection by telegraph with Saigon, as before mentioned; there is also a signal station at Fa mi point, 4 miles below the Saigon branch. Vessels proceeding up the river are required to make their number by the International Code to Fa mi point station, and to sound the steam whistle at intervals until answered. If the answering pennant is shown from the signal station the vessel may proceed to the port, but if the Code signal to anchor is hoisted, the vessel must anchor in the main river until permission is given to proceed. At night a *white* light is shown in lieu of the answering pennant. Vessels, from abreast Fa mi point signal station, if proceeding to the city, must hoist two lights vertical, aft, not less than 5 feet apart; if about to anchor in the main river they are not to hoist them.

**The Channel** at the entrance to the river forms an elbow to Kangio point, the first land met with on the west side when entering. It is 10 miles in length, and between the north point of Cocoanut bay and the

Charts, 1,281  
[2,697].  
1,016 [3,151].  
1,269 [2,698].  
Var. 2° E.

Eastern (International) Telegraph Company are in Cocoanut bay. There is a semaphore station connected with Saigon by telegraph. See also page 409.

**Ganh Rai bay**, the estuary of the Saigon, is encumbered with a flat extending about 2 miles from its eastern shore, and is covered with fishing stakes; the Chavia and Rach lap, page 406, discharge into it.

**DANGERS in the approach to Saigon river.**—The bank fronting the entrances to the eastern branches of the Mekong, to the distance of about 12 miles, has been previously referred to.

**Kangio or Bassok bank** forms the western side of entrance to Saigon river. It extends  $5\frac{1}{2}$  miles south-eastward of the land south-westward of Kangio point, and dries from 3 to 4 feet in places for about  $3\frac{1}{2}$  miles off shore, with depths of less than 3 fathoms over the remainder. Its eastern edge is  $1\frac{1}{2}$  miles distant from the east point of entrance, northward of cape St. James, with a depth of 7 to 12 fathoms. The bank is covered with fishing stakes, out to the depth of 3 fathoms in places.

Lat.  $10^{\circ} 17\frac{1}{4}'$  N.  
Long.  $107^{\circ} 24'$  E.

A patch about half a mile in length with a least depth of  $2\frac{1}{2}$  fathoms, lies 2 miles E.S.E. of the south-east extreme of Kangio bank, within the 5-fathoms contour line, with cape St. James' lighthouse bearing N.E.  $\frac{1}{2}$  E., distant  $3\frac{1}{2}$  miles.

**Ranza shoal**, with a least depth over it of 15 feet, lies with cape St. James' lighthouse bearing N.E. by E.  $\frac{1}{2}$  E., distant 9 cables. The north point of Fausse bay opening westward of the small islet near the north point of Cocoanut bay, bearing N. by W.  $\frac{1}{4}$  W., leads close westward of the shoal, which may be recognised by the colour of the water and eddies.

**Formosa bank**, within a depth of 3 fathoms, is about a mile in length by half a mile in breadth, with a least depth of  $2\frac{1}{4}$  fathoms, situated with cape St. James' lighthouse bearing N.W. by W.  $\frac{1}{2}$  W., distant  $1\frac{1}{2}$  miles. It is composed of hard sand, with depths of  $3\frac{1}{4}$  to 5 fathoms extending nearly 2 miles east-north-eastward of it.

About  $1\frac{1}{2}$  miles south-westward and south-eastward of Formosa bank are several shoals with less than 5 fathoms; on one of these there is but  $3\frac{1}{2}$  fathoms, with cape St. James' lighthouse bearing N.W. by W.  $\frac{3}{4}$  W., distant  $3\frac{1}{4}$  miles. The lighthouse bearing N. by W., or northward of that bearing, leads westward of all these banks. The bay between cape St. James and Ti wan is shallow, the outer limit of which,  $4\frac{1}{4}$  to  $4\frac{3}{4}$  fathoms, with 6 to 8 fathoms close-to, lies S.W. about  $3\frac{1}{2}$  miles from cape Ti wan. (*Dangers eastward continued on page 416.*)

Lat.  $10^{\circ} 19' 51''$  N.  
Long.  $107^{\circ} 4' 55''$  E.

**LIGHTS.—Cape St. James.**—From a circular white tower, 26 feet high, standing on the southernmost of the heights of cape St.

**James**, a *fixed white* light is exhibited at an elevation of 488 feet above high water, visible in clear weather from a distance of 30 miles. Charts, 1,261 [2,697], 1,016 [3,151]. 1,269 [2,698]. Var. 2° E.

**Kua Dong tranh**.—From a square white tower on the east point of entrance to Kua Dong tranh (between Loirap river and Kangio point), is exhibited at an elevation of 73 feet above high water, a *white* light showing *fixed* and *flashing* sectors as follows:—*Quick flashes* between the bearings of N. 54° W. and N. 13° W.; *fixed* from N. 13° W. to N. 9° E.; *quick flashes* from N. 9° E. to N. 36° E.; *fixed* from N. 36° E., through east, to S. 54° E.; obscured elsewhere. It is visible in clear weather from a distance of 14 miles.

**Kangio bank**.—A *fixed red* light, visible in clear weather from a distance of 7 miles, is exhibited at an elevation of 32 feet above high water from a pile lighthouse on the north-east edge of Kangio bank. The light is obscured over the banks on the western side of Saigon river entrance. Lat. 10° 24' N.  
Long. 107° 0' E.

**Fuok binh kiang**.—A *fixed white* light, elevated 33 feet above high water and visible from a distance of 7 miles, is exhibited from a pile lighthouse, close to the edge of the shallow bank on the west side of Saigon river, N.W.  $\frac{1}{2}$  W., distant  $2\frac{1}{2}$  miles from Kangio point.

At 7 cables N.  $\frac{3}{4}$  W. from the lighthouse there is an iron framework beacon, upper half painted white, lower half black.

**Rach Gioi**.—A *fixed green* light is shown from an iron support, 26 feet in height, 100 yards northward of the mouth of the Rach Gioi,  $2\frac{1}{2}$  miles above Fa mi point, visible at the distance of 7 miles.

**Don nai**.—A *fixed red* light, visible at the distance of one mile, is exhibited at the south point of the junction of the branch that leads to Saigon city. Lat. 10° 44' N.  
Long. 106° 45' E.

**Signal stations**.—There is a semaphore station near the lighthouse on cape St. James, in connection by telegraph with Saigon, as before mentioned; there is also a signal station at Fa mi point, 4 miles below the Saigon branch. Vessels proceeding up the river are required to make their number by the International Code to Fa mi point station, and to sound the steam whistle at intervals until answered. If the answering pennant is shown from the signal station the vessel may proceed to the port, but if the Code signal to anchor is hoisted, the vessel must anchor in the main river until permission is given to proceed. At night a *white* light is shown in lieu of the answering pennant. Vessels, from abreast Fa mi point signal station, if proceeding to the city, must hoist two lights vertical, aft, not less than 5 feet apart; if about to anchor in the main river they are not to hoist them.

**The Channel** at the entrance to the river forms an elbow to Kangio point, the first land met with on the west side when entering. It is 10 miles in length, and between the north point of Cocoanut bay and the

Charts, 1,201  
[2,697].  
1,016 [3,151].  
1,209 [2,698].  
Var. 2° E.

Kangio bank,  $1\frac{2}{3}$  miles in breadth, gradually narrowing to three-quarters of a mile abreast Kangio point, where the river is usually considered to begin. The bottom of the channel is soft mud, with depths of 7 to 12 fathoms, and vessels may anchor in any part of it. The best anchorage during the south-west monsoon is northward of Kangio point.

The entrance of the river at Kangio point cannot be made out when distant, the land being very low and covered with brushwood. The best mark is a remarkably small clump of trees of moderate height, on Kangio point (marked B on chart); they are best seen from abreast Cocoanut bay, and form an excellent mark.

**Kangio** is a small fishing village on Kangio point, west side of river.

**Banks in the river.**—Banks which are steep-to extend from both sides of the river between Kangio point and the points marked E and F on the chart, considerably narrowing the channel. The river thence to the Coral bank, which formerly barred the channel to large vessels, about 16 miles above, is free from danger if the vessel follows the bends of the river and avoids the points; there is one exception to this, there being a mud bank in the bend (N) 2 miles below Coral bank, extending two-fifths of the distance across the river.

Plan on chart,  
1,209 [2,698].  
Lat. 10° 37' N.  
Long. 106° 51' E.

**The Coral bank** has now a dredged channel through it from 560 to 620 feet in width, with about 23 feet at low water. Here the channel is close round the point, the bend opposite being somewhat encumbered with the undredged reef.

**Beacons.**—Two beacons erected on the north shore of the bend northward of Coral bank, when in line bearing N. 29 W., lead through the dredged channel from the southward but rather on the westward side of it; the helm should be altered in time to continue through the cutting with the two beacons on the eastern shore, in line astern bearing S. 67° E., which leads through.

**Wreck.**—The wreck of the s.s. *Carlisle*, with mast, funnel, &c. above water, lies near the eastern bank, about a mile northward of Fa mi point.

Lat. 10° 41' N.  
Long. 106° 45' E.

**Dangerous bank.**—The bend above Fa mi point should be closely followed to avoid the (Ville de Paris) bank, nearly awash in places, and composed of sand and rock, which extends nearly half way across from the eastern bank of the river. At the junction with the Saigon branch a bank extends from the northern shore, whilst the south point is free from danger. Above this the channel is clear up to the city.

**Tides.**—It is high water, full and change, at cape St. James at 2h. 30m. and at Kangio half an hour later; springs rise  $12\frac{1}{2}$  feet. The spring tides are said to run strong, but they are probably of less strength than at Saigon, below mentioned; the ebb lasts longer than the flood.

Neap tides are feeble and irregular. On the Coral bank up the river, high water occurs one hour before high water at Saigon; and the rise is the same. Charts, 1,261 [2,697], 1,016 [3,151].  
Var. 2° E. 1,269 [2,698].

At Saigon the tidal streams, which are tolerably regular about the springs, run about 2 knots, but sometimes attain a speed of 4 knots (probably in the rainy season); it is high water, full and change, at 4h. 30m., and the spring rise is 12 feet.

**Pilots.**—Pilotage for Saigon river is compulsory, whether a pilot be received on board or not. It is advisable that vessels of war should employ pilots on a first visit, as they are acquainted with the mooring buoys at Saigon, *see Anchorage*, page 413. They are instructed to hand to all masters of vessels arriving a copy of the Port Regulations. The pilots are stationed in a vessel off Cocoanut bay, and at Saigon. The pilot flag is blue with a square white centre.

**Tugs** are available.

**DIRECTIONS.**—There is no difficulty in a steam-vessel approaching Saigon river, cape Ti wan\* and cape St. James with its \*Lat. 10° 22' N.  
Long. 107° 15' E. lighthouse being capital land-marks.

In thick weather careful attention to the lead will keep a vessel clear of the banks which front the mouths of the rivers to the southward.

Coming from the north-eastward, Britto bank and the shoals off cape Ba ké should be given a wide berth.

To proceed into and up the river.—The two western points of cape St. James peninsula (marked *a*\* and *b* on the chart) kept in line, bearing N. by W.  $\frac{1}{4}$  W., lead in between the shallow banks on either side of the approach, passing close westward of Ranza shoal. (At night, *see lights*, page 407.) Thence keep about half a mile off shore until the north peak of cape St. James shuts in behind the north point of Cocoanut bay, bearing S.E.  $\frac{1}{4}$  S. astern, which mark will lead up the fairway to the river entrance, eastward of the lighthouse on Kangio banks, until the north extreme of Kangio point bears W.  $\frac{1}{4}$  N. Then the lighthouse on the bank above should be steered for, bearing N.W. by W.  $\frac{1}{4}$  W., before and beyond which the pecked line on the plan should be followed, taking the bends and avoiding the points. The bight marked N is an exception to this rule, as it is shallow.

The river is somewhat tortuous for a long vessel, but nevertheless is easily navigated with proper care. Leading beacons are established for passing the Coral bank, for which *see Banks in the river*, page 410. Above Fa mi point, keep the western shore aboard to avoid the Dangerous (Ville de Paris) bank; thence steer fairly close around the point marked V to avoid the bank on the opposite side, into the Saigon branch, in which there are no dangers below the city. *See Signal station, Fa mi point*, page 409.

Charts, 1,281  
[2,697].  
1,016 [S.151].  
1,283 [2,698].  
Var. 2° E.  
Lat. 10° 22' N.  
Long. 107° 15' E.

The best time to arrive at Saigon city is at high water, or on the first of the ebb, as the vessel will be more easily berthed.

**Sailing vessels.**—In the north-east monsoon sailing vessels from the southward should make the land to windward of the port, or they may be set to leeward of cape St. James, and towards Kangio bank, by the prevailing current, accelerated by the flood stream. During the ebb, however, the current is at times overcome, and there may be a north-easterly set.

At about 90 miles from the coast, the wind in settled weather usually hauls to E.N.E. and East about 4 p.m., continuing all night fresh and puffy. This is the time for sailing vessels to stand in-shore, and although as far to leeward as the meridian of cape St. James, with the ebb tide under the lee, the vessel will be to windward of cape Ti wan in the morning.

Entering the river, the fairway mark is the two points of the cape land (marked *a* and *b* on the chart) northward of Cocoanut bay in one, bearing N. by W.  $\frac{1}{4}$  W.; this will lead between the shallow banks on either side in depths of 6 to 7 fathoms, but close westward of Ranza shoal with  $2\frac{1}{2}$  fathoms, see page 408.

Cape Ba ké seen well open of cape Ti wan, bearing N.E. by E., leads southward of the patches off cape St. James, and the lighthouse bearing N. by W. leads to the westward.

The western extreme of the north point of the cape land bearing North, will lead clear of the  $2\frac{1}{2}$ -fathoms patch on the western side of the channel. See remarks on pilot, &c., below.

**In the south-west monsoon.**—From abreast Pulo Condore, steer to pass along the edge of the bank fronting the delta of the Mekong, and extending to the mouth of the Saigon river.

Strong freshets run out of these rivers during this monsoon, and join the north-easterly current, whereby vessels are obliged to keep the edge of the bank aboard to prevent being set to leeward of cape St. James. The lead should be kept constantly going while steering along the edge of the bank, keeping in not less than 10 fathoms. Should the water begin to shoal, haul off to the eastward, when it will soon deepen as the depths are fairly regular.

Continue along the edge of the bank in these depths until cape St. James bears about N.N.E., when the fairway of the river may be steered for, as before mentioned for north-east monsoon period.

Above cape St. James a sailing vessel will be in charge of a pilot and probably in tow, so that it is not necessary to offer further directions.

**Anchorage.—The Port** of Saigon extends north and south of the Arroyo Chinois ; up to the Arroyo de l'Avalanche (Tin ghé) on the north, and to the South fort (petroleum dépôt) on the south. All vessels are berthed under the direction of the harbour master. The northern portion of the harbour has several mooring buoys in depths of 5 to 7 fathoms, and is reserved for vessels of war. The southern is the Commercial port ; here vessels are moored head and stern between mooring buoys, or are berthed alongside the wharves. There are large petroleum stores in the main river at the Rach Gioi, above Fa mi point.

At the entrance of the Arroyo Chinois is the Custom House and the signal station of the Commercial port, and this branch of the river is spanned by a handsome bridge. There are numerous wharves and quays alongside which vessels load and discharge.

No vessel is allowed to anchor in the river, except below the lower moorings and out of the fairway at a long distance from the town, and no vessel is allowed to anchor in the river lower down, unless in case of necessity, within one mile on either side of the sharp curves of the river such as near the Coral bank cutting.

**The CITY of SAIGON** stands on the west bank of the Saigon, a branch of the Don nai, about 48 miles from cape St. James ; it is the capital of the French possessions in Cochin China, and has recently undergone considerable alterations. The ruins of the old fortifications have entirely disappeared, and a new citadel has been built. Broad streets lined with trees, bordered by fine European houses, and public gardens testify to the wealth of the colony ; canals have been carried through the principal parts of the town, whilst about two-thirds of the frontage on the river is now occupied by Government establishments. The principal objects are the cathedral, the gothic chapel of Saint Enfance, the palace of the governor, the prison, and the military hospital.

The city is situated between two small rivers, the southern one of which is named Viaim Ben ghé, or Arroyo Chinois, the principal centre of trade being about  $2\frac{1}{2}$  miles up this river ; the northern one is named Tin ghé or Arroyo de l'Avalanche ; their distance apart is about  $1\frac{1}{2}$  miles.

The business part of the city extends from the Viaim Ben ghé, nearly a third of the distance to the Tin ghé, where is the principal landing place, a straight road from which leads to the observatory and the residences of the governor and principal officers, situated on some rising ground nearly half a mile from the river. Above the landing place and road just mentioned, along the bank, are the commissariat stores, artillery ground, and dockyard, the latter extending to the Tin ghé river. At the back of the commissariat stores and artillery ground are the hospitals, and still

Chart , 1,281  
[2,697].  
1,016 [3,151].  
Plan of Saigon  
roadstead on  
chart, 1,281  
[2,697].  
Var. 2° E.

Plan of Saigon  
roadstead on  
chart, 1,269  
[2,698].  
Lat.  $10^{\circ} 46' N.$   
Long.  $106^{\circ} 42' E.$

farther back, nearly half a mile from the river, is the citadel, a large square fortification with a bastion at each quarter.

**Population.**—The population of Saigon proper in 1901 was 47,577 exclusive of the Naval and Military forces. The French population numbered 5,475 ; other Europeans 300. Cholon, or Chinese Town, about 2 miles south-westward, had a population in the same year of about 130,000. It is the mart for all produce of the colony and of Cambodia, is the residence of all Chinese merchants, and the rice mills are situated therein.

**Supplies.**—Beef, bread, vegetables, ducks, fowls, and fish, &c. are obtainable, and good water is supplied by tank boats from the reservoirs on the hill westward of the city.

**Coal** can be brought alongside in lighters. About 200 tons can be put on board in a day, and 300 tons working day and night. About 22,000 tons are imported annually, and from 1,000 to 3,000 tons are kept in stock. A quay is under construction, at which steamers may coal, 500 yards of which is completed out of the 2,000 yards proposed, alongside which there will be a depth exceeding 30 feet.

**Docks.**—There is a Government dry dock at Saigon, 545 feet in length (508 feet on blocks), 68 feet wide, and with 30 feet water over the sill at high water springs, capable of taking a vessel of  $27\frac{1}{2}$  feet draught. Also a smaller dock 230 feet in length, and  $32\frac{1}{2}$  feet wide, with a depth of 10 feet on sill. There is a basin, 240 feet in length by 78 feet in breadth in which vessels of 13 feet draught can be repaired.

A floating dock is building, 400 feet in length, 66 feet in inside width, to lift vessels of 10,000 tons.

The Government machine shops are capable of doing the heaviest work; there are floating steam cranes with a lifting power of 30 and 50 tons. The Cie. Messageries Fluviales can also undertake heavy repairs.

**Hospital.**—There is a military hospital where seamen are received.

**Shipping.—Trade.**—The total number of vessels of all nations which entered the port in 1902 was 728 of 998,619 tons; this includes the mail steamers. Of these, 133 vessels were British, with a total of 209,929 tons.

The aggregate value of the exports for the year 1897 was 3,900,050*l.*, of this amount the rice was valued at 2,701,840*l.*

The chief exports are rice, salt, fish, silk, cotton, pepper and cardamoms; the imports consist of Chinese merchandise, English calicoes, silks, opium, tea, wines, and drugs. Saigon is no longer a free port.

**Communication.**—The Messageries Maritimes run two lines of steamers from Saigon in connection with their main line; the one, bi-monthly, does the service of Annam and Tong King to Hong Kong,

calling at Nhatrang, Kin Hon, Tourane and Haifong, &c.; the other, monthly, between Saigon and Manila.

Charts, 1,261  
[2,697].  
1,260 [2,698].  
Lat. 10° 46' N.  
Long. 106° 42' E.

Saigon and Mitho on the Mekong are connected by a railway 55 miles in length; a railway from Saigon to Khanhoâ is proposed. A tramway connects Saigon with Cholon. The innumerable streams which intersect Cochin China afford every facility for transporting the products of the country. There is a weekly service from Saigon to Khone on the Mekong, during the favourable season; the river could be made navigable for steamers of 3 feet draught from Kratie to Stung-treng, *see pages 400–403.*

**Telegraph.**—The telegraph service of Cochin China and Tong King are connected by submarine cable from cape St. James with Singapore and Hong Kong. Office at Saigon is always open.

**Time signal.**—The guardship fires a gun at noon, Saigon meantime.

**Climate.**—Like most tropical countries there is a dry and a wet season at Saigon; the former corresponds to the period of the north-east monsoon and the latter to that of the south-west monsoon. The mean temperature varies from 68° to 86°, but at times in the dry season it reaches 93° in the day time, sinking to 63° at night; this is the period of fine weather with a clear sky and fresh breezes, and Saigon is then not a disagreeable place to live in, though the temperature shown is high; occasional gales of short duration are experienced.

In the south-west monsoon period, from May to September, the atmosphere is hot, humid, and very distressing to the body; but the heat is somewhat lessened by the cloudy sky and the daily showers.

The hottest months are from March to June when the temperature is as much as 97° at times. *See Weather table, page 562.*

Health at Saigon has been much improved in late years, from a better understanding of the prevalent diseases and from the increased comforts of living. Bathing, moderate exercise in the shade, spare regular diet, and ample rest, are the best preventatives. Exposure to the sun, indolence, irregular diet, excess of fatigue and of drinking, must be avoided.

**Winds.**—In December, January, February, and March, the monsoon at cape St. James is steady and strong, with dry hot weather; it then gradually abates in strength until it ceases. The land and sea breezes then become steady, generally blowing from E.N.E. and sometimes from N.E. during the night, and drawing round to the East in the morning; the sea breeze then generally sets in from S.E. towards noon, or early in the afternoon.

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Charts. 1,261  
[2,697]  
1,269 [2,603].  
Var. 2° E.

the N.E., which freshens as the day advances, veering through east, and in the afternoon blowing from the S.E. It blows very fresh during the day, moderate towards the evening, and falls at night.

In the south-west monsoon the winds are variable between West and S.W. The sea breeze blows fresh up the river, gradually dying away in the evening. In settled weather the wind is from S.W. to S.E., and sometimes E.S.E. at cape St. James.

**Hurricane.**—A hurricane passed over Saigon at 3.30 p.m. on May 3rd, 1904, doing much damage to property, and causing vessels to break adrift; considerable injury was done to native craft. There was at the same time a heavy storm on the coast, which was also felt at the smaller ports of the district. A hurricane at Saigon is of rare occurrence.

#### COAST OF ANNAM.

**General remarks.—Winds.**—The monsoons blow nearly parallel to the coast of Annam and are established about the middle of May and the middle of October, the south-west monsoon being generally preceded in April by about a month of calm weather. To the northward of cape Padaran the north-east monsoon is generally stronger than to the southward. During the south-west monsoon, land and sea breezes occur tolerably regularly; the land breeze commences towards midnight and falls about 7 or 8 a.m.; the sea breeze, generally from S.E., commences about noon, and dies away about 8 p.m.

**Currents.**—From the entrance to Saigon river to cape Padaran the currents are weak and rarely exceed a mile an hour; they are strongest between cape Padaran and cape Varella, varying in velocity from 2 to  $2\frac{1}{2}$  miles an hour, and sometimes in the north-east monsoon attaining a speed of 4 miles. Between Varella and Kin Hon they are moderate, and run at most  $1\frac{1}{2}$  miles an hour; between Kin Hon and Kulao Rai, about 2 miles, and about the same between the latter and Tourane. In August and September the current is feeble between Varella and Tourane; a current setting S.S.E. about three-quarters of a mile has been observed. During the strength of the south-west monsoon, the current sometimes attains a rate of 2 to  $2\frac{1}{2}$  miles, between Kulao Rai and Chumai.

The direction of the current is with the wind, and as a rule nearly parallel to the coast.

Lat.  $10^{\circ} 22\frac{1}{4}'$  N.  
Long.  $107^{\circ} 15'$  E.

**CAPE TI WAN,** 10 miles east-north-eastward of cape St. James, attains a height of 984 feet at  $1\frac{1}{2}$  miles within it, and will usually be seen before cape St. James. The coast between these capes is low, and the bay very shallow, especially in its eastern portion, where the depth is only 2 fathoms at nearly 3 miles from the shore. The Kua lap discharges into

General chart, 2,660a [2,678].

the bay, and is navigable by boats; it connects with the Rach lap and Saigon river.

Chart. 1,281  
(2,697).  
Var. 2<sup>b</sup> E.

**Pernambuco rock**, with a depth of  $1\frac{1}{4}$  fathoms, and 6 to 8 fathoms around, lies S.E.  $\frac{1}{4}$  S. 2 miles from cape Ti wan, and is situated  $11\frac{1}{2}$  miles E.  $\frac{3}{4}$  S. of cape St. James' lighthouse. The 5-fathoms contour-line is about 3 miles off the coast between.

**CAPE BA KÉ**, 394 feet in height, situated about 17 miles east- Lat.  $10^{\circ} 29' N.$   
north-eastward of cape Ti wan, is the boundary between Lower Cochin Long.  $107^{\circ} 31' E.$   
China and Annam. A range of sand hills extends from it westward to Tram point, which is from 120 to 150 feet in height, and formed of yellowish-white sand hills.

Just westward of Tram point is the village of Tuok ai xa, and farther westward in the bay formed between it and cape Ti wan, are the villages of Xich Ram and Fuok ai (or Loui Rê), the former at the mouth of a stream of the same name. This bay is fronted by a bank with less than 3 fathoms to the distance of 2 miles; seaward of which is an isolated bank  $2\frac{1}{2}$  miles in length, with a depth of  $3\frac{3}{4}$  fathoms at 4 miles off shore.

A shoal, with 4 feet water, within the 5-fathoms line, lies  $1\frac{1}{2}$  miles eastward of Tram point.

**Ba Ké shoals**, a number of isolated patches having from  $3\frac{1}{4}$  to 5 fathoms water over them, and 6 to 8 fathoms around, lie immediately abreast Tram point; the outermost, with  $4\frac{1}{2}$  fathoms, lies with cape Ba Ké bearing N.  $\frac{1}{4}$  W., distant 8 miles.

**Rock**.—A small pinnacle rock, with a depth of about 2 fathoms and Lat.  $10^{\circ} 24' N.$   
7 to 10 fathoms close around, lies with cape Ba Ké bearing N.W.  $\frac{3}{4}$  N., Long.  $107^{\circ} 34' E.$   
distant 6 miles, and cape Ti wan about W. by S. The steamship *Glamorganshire* was wrecked on it in 1897. The position given is from a French survey.

These dangers, from the water shoaling suddenly over a hard bottom, cause overfalls, particularly near the edge of the shore bank; but out in a depth of 10 to 12 fathoms the bottom is generally soft, and the depths regular. These shoals will be avoided when proceeding eastward by keeping cape Ti wan northward of W.  $\frac{1}{4}$  N., until cape Ba Ké bears N.W.

**Tides**.—It is high water, full and change, at cape Ba Ké at 1 hour 45 minutes. Springs rise 13 feet.

**Britto bank**, named after a Portuguese captain who was wrecked upon it, is about  $1\frac{1}{2}$  miles in extent, and consists of four shoal patches, on which the least depth is  $1\frac{1}{4}$  fathoms, on the southern one, from which the summit of cape Ba Ké bears W.  $\frac{1}{4}$  N., distant about 20 miles, and Cow

Lat.  $10^{\circ} 29' N.$   
Long.  $107^{\circ} 50' E.$

Chart. 1,261  
[2,697].  
Var. 2° E.

island N. by W.  $\frac{1}{4}$  W., 10½ miles. There are depths of about 10 fathoms around the bank.

**Buoys.**—Britto bank is marked by two whistle buoys:—

N.E. Britto bank buoy, painted black and white in horizontal bands, with the word *Britto* on it, is moored in 6½ fathoms, with Kega point lighthouse N.N.E.  $\frac{7}{8}$  E. distant 15½ miles, and cape Ba Ké bearing West.

N.W. Britto bank buoy, painted black and white in vertical stripes with the word *Britto* on it, is moored in 7 fathoms about west-north-west, one mile from the N.E. buoy. These buoys are liable to drift.

**Channel within Britto bank.**—The depths for about 12 miles eastward of cape Ba Ké decrease regularly towards the shore, but between Britto bank and the coast there are known to be several shallow patches, and others may exist.

The outermost of these, with 3½ fathoms, lies about midway between, and 6 miles from the nearest land with the summit of cape Ba Ké bearing W. by S., distant 15½ miles; and Cow island N. by E.  $\frac{3}{4}$  E. 7½ miles.

A patch of 2½ fathoms lies 2½ miles N.N.W. of it, apparently the south-west extreme of the shallow bank fronting the coast. Patches of 4½ fathoms lie without the 5-fathoms contour-line for about 3 miles to the westward of the shoals just described.

**Directions.**—Coming from the south-westward, the summit of cape Ba Ké, bearing W.  $\frac{1}{4}$  S. astern, will lead between Britto bank and the 3½-fathoms patch 5 miles in shore of it; a vessel will be eastward of the latter when Cow island bears N.  $\frac{1}{2}$  E., and of Britto bank, when Kega point lighthouse bears N.N.E.  $\frac{1}{2}$  E. Being seaward of Britto bank in thick weather, it is not advisable to approach it under a depth of 16 fathoms. The bank is buoyed as before mentioned.

Lat. 10° 38' N.  
Long. 107° 48' E.

**COAST.**—Cow island, situated 20 miles N.E. by E.  $\frac{3}{8}$  E. of cape Ba Ké, is a small round island with trees, lying about a mile from the coast, and 1½ miles off the entrance of a stream; the depths decrease regularly towards it.

Between cape Ba Ké and Cow island the land is low and wooded in parts near the sea.

**Laghi.**—In the bight between Cow island and Kega point is the village of Laghi, at the mouth of a stream, north-west of which is a range of low hills. Patches of 4½ and 4¾ fathoms lie 5 and 6 miles, respectively, S.E.  $\frac{1}{4}$  S. of the village, with depths of 7 and 8 fathoms around them.

**KEGA POINT** is the extremity of a tongue of low land the Chart. 1,261  
[2,697].  
Var. 2° E. prolongment of a spur from mount Tai ku, terminating in an islet, on which is a conspicuous lighthouse.

Inland the country is high, and the regular sloping mountain Tai ku (Nui tra kau) attains a height of 1,312 feet, at 9 miles north-west from Kega point. This mountain is visible a considerable distance from seaward, being the most conspicuous land in this part of the coast, and detached from any other high land.

**Shoals.**—About 4 miles W. by S. from Kega point, and  $2\frac{1}{2}$  miles from the shore, is a patch of  $2\frac{1}{2}$  fathoms, fine sand, within the 5-fathoms line. Between it and the point, at half a mile off shore, is a patch with  $2\frac{1}{2}$  fathoms. The lighthouse on Kega islet bearing N.E. or northward of that bearing, leads eastward of these patches, and of the patches of  $4\frac{1}{2}$  and  $4\frac{3}{4}$  fathoms south-westward of them.

Abreast and to the eastward Kega point is bold.

**LIGHT.**—From an octagonal granite tower on Kega islet, 115 feet in height, and at an elevation of 213 feet above high water, a *fixed and flashing white* light is exhibited with a period of *two minutes*, visible in clear weather from a distance of 21 miles. Proposed to change to *fixed* in 1905.  
Lat.  $10^{\circ} 41' N.$   
Long.  $108^{\circ} 01' E.$

**Tides.**—It is high water, full and change, at Kega point at 12 h. Springs rise 13 to 14 feet. The tidal streams are only felt along this coast during calms; the flood sets south-westward, the ebb north-eastward.

**Pulo Cecir de Mer.**—For the description of this island and the Lat.  $10^{\circ} 33' N.$   
Long.  $108^{\circ} 37' E.$  banks north-west of it, see pages 121–123.

**Madge bank**, discovered by Captain C. D. Madge, s.s. *Recorder*, 1887, lies with Kega point lighthouse W.  $\frac{3}{8}$  N., and Viné point N.  $\frac{1}{2}$  W., distant 15 miles. It is about  $1\frac{1}{2}$  miles in extent, with depths of 8 to 9 fathoms over a coral bottom.

**Fanthit bay** lies between Kega point and Viné point, 22 miles to the north-east, with the village of same name on a small stream, about midway between. Some rocks above water lie half a mile south-west of the entrance to the river; a mooring buoy lies in a depth of 3 fathoms with the custom-house at Fanthit bearing N.  $\frac{1}{2}$  E. About  $2\frac{1}{2}$  miles south-westward of this village, and about  $1\frac{1}{2}$  miles from the shore, there is anchorage in 4 to 5 fathoms.

**LIGHT.**—A *fixed white* light, elevated 38 feet above high water, and Lat.  $10^{\circ} 54' N.$   
Long.  $108^{\circ} 03' E.$  visible in clear weather from a distance of 8 miles, is exhibited from an iron trellis-work structure on the north-east wall of the custom house at Fanthit, on the east side of the entrance to the river.

Chart. 1,261  
[2,097]  
Var. 2° E.

Lat. 10° 54' N.  
Long. 108° 18' E.

Fishing nets may be found at the distance of about 10 miles from the land, abreast Fanthit bay and Viné point.

**Viné point** is formed by a low hill, steep on its south side, and surmounted by tall trees; it is the south extreme of a peninsula projecting nearly 3 miles from the adjacent coast. There is anchorage in 3½ fathoms in the bay westward of the point, during the north-east monsoon, opposite a fishing village.

Anchorage can be obtained in the south-west monsoon in a bay on the east side of Viné point, in depths of 3 to 5 fathoms. There is a fishing village in the bay north of it.

Tiger island (Hon lao) lies close to the east side of Viné point, with a boat passage between; it is not conspicuous from the offing. Viné point is fairly steep-to on its eastern side.

Lat. 11° 3' N.  
Long. 108° 29' E.

**Guio point.—Fanri bay.**—Guio point, situated about 13 miles north-eastward of Viné point, forms the south point of Fanri bay; mount Guio, a sand hill, 853 feet in height, near the coast nearly 5 miles to the westward, serves to identify it. The bay in which the mount lies has not been sounded, but the east side of Guio point is fairly steep-to.

Fanri bay between Guio point and Logan point is about 15 miles wide with depths gradually decreasing from the offing; its shore is fronted by a bank to about half a mile, increased to nearly a mile off Fanri village, situated at the mouth of the Luong river.

From Guio point the coast to Fanri is formed of cliffs of a reddish colour, but to the northward it is sloping and wooded.

A vessel may anchor in a depth of from 4 to 5 fathoms about 2 miles south-west of the mouth of Luong river, with Logan point bearing E. by N. ¼ N.; the bar of the river has but about 3 feet water and is only navigable by boats. Fanri is a fishing village, the boats from which are seen in the offing, sometimes at a considerable distance from the shore.

**Logan point** is a narrow low neck of land, projecting a mile southward of the adjacent coast. On its west side there is a bay with a fishing village; this bay affords good anchorage in about 3½ fathoms during the north-east monsoon period. There is also a village north-north-eastward of the point, off which vessels may anchor in a depth of 5 to 6 fathoms in the south-west monsoon. A shoal with less than 3 fathoms extends 1½ miles south-west from the point.

A shoal, about a mile in extent, with 4½ fathoms water over it, was discovered in 1862 by H.M.S. *Vulcan*, at about 2½ miles southward of Logan point, with the east extreme of the point bearing N.N.E. and the west extreme N. by W.; it is possibly the prolongation of the shoal off the point.

**Amazon shoal**, with  $4\frac{3}{4}$  fathoms and 7 to 8 fathoms, close around, lies with Logan point bearing N.W.  $\frac{3}{4}$  W., distant 4 miles. Chart, 1,261  
[2,697]  
Var.  $2^{\circ}$  E.

**Duchaffaut shoal**, with  $4\frac{1}{4}$  fathoms, lies with Logan point bearing N. by W.  $\frac{7}{8}$  W., distant  $6\frac{1}{4}$  miles. Lat.  $11^{\circ} 4' N.$   
Long.  $108^{\circ} 44' E.$

The Messageries Maritimes' steamer *Melbourne* reported a depth of  $4\frac{1}{2}$  fathoms about 2 miles W. by N.  $\frac{1}{2}$  N. of Duchaffaut shoal, with Logan point N.  $\frac{1}{8}$  W., distant  $5\frac{1}{4}$  miles. Depths of  $5\frac{1}{2}$  fathoms were found  $1\frac{1}{2}$  miles north-east and three-quarters of a mile W.S.W. of that position. As rocky heads of  $3\frac{3}{4}$  fathoms, upon banks of sand and coral, have been reported in this locality it should be given a wide berth. A bearing of cape Padaran, and of its light at night, will keep a vessel eastward of these banks. Fishing stakes mark these banks occasionally.

**Althea shoal**, with 6 to 8 fathoms, and 3 miles or more in length in a north-east and south-west direction, is charted with its eastern end lying with Logan point bearing about N.N.W., distant  $12\frac{1}{2}$  miles; it was unsuccessfully searched for by the French ship *Bourayne*, 1878, and its existence is doubtful.

**Pulo Cecir de Terre or Kulao Kau**.—Eastward of Logan point is a bay about 13 miles wide, in which is situated Pulo Cecir de Terre, a low island, about one mile in length, cliffy on the east and south sides, and having near its centre a mass of rocks higher than the other parts, which is visible at the distance of about 15 miles. The island is rocky and barren, with the exception of a little grass on the flat part. Rocks above and below water surround the island to a short distance, and there is a patch of 3 fathoms half a mile north of the east end, and another of  $1\frac{3}{4}$  fathoms half a mile south-west of the west end. The island stands within the 5-fathoms contour fronting the bay, but about 2 miles E. by S.  $\frac{1}{4}$  S. of its north-east point a sounding of  $4\frac{3}{4}$  fathoms is reported as having been obtained. Lat.  $11^{\circ} 14' N.$   
Long.  $108^{\circ} 50' E.$

**Overfalls** are met with from 6 to 12 miles southward of Cecir de Terre, where the depths are irregular, ranging from 8 to 16 fathoms.

**Breda bank**.—Between Pulo Cecir de Terre and Padaran gap lies Breda bank, with a least known depth of 2 fathoms, coral bottom, with the island bearing S.W. by S., distant 4 miles; the bank is  $1\frac{1}{4}$  miles in extent with depths under 5 fathoms, and less water than 2 fathoms may exist.

Padaran gap, bearing westward of N. by W., leads eastward of Breda bank.

**The coast**.—The bay within Pulo Cecir de Terre is backed at a short distance by mountainous land, attaining a height of 3,051 feet. Within Logan point also are mountains 2,624 feet in height.

Charts, 1,281  
[2,697]; 3,028  
[2,701].  
Var. 2° E.

**Padaran gap** is situated near the eastern portion of the bay mentioned as being 13 miles wide, and is conspicuous from the south-westward only.

**Anchorage** may be obtained in the north-east monsoon period off the gap, in a depth of 6 to 10 fathoms, sand. Two rocky heads, 22 yards apart, covered at high water and which only break during bad weather, lie about a third of a mile from the eastern shore, with the south extreme of the land (off which is a rock) bearing S.E. by E.  $\frac{1}{4}$  E., and the pagoda of the village N. by W.  $\frac{1}{4}$  W.

Rocks above water front the shore on the west side of the gap.

Lat. 11° 22' N.  
Long. 100° 1' E.

**CAPE PADARAN** (Mui Dinh), is high land, steep and convex to seaward, forming the south-east extreme of the continent. The high land of cape Padaran extends about 7 miles west-south-westward from the cape and attains a height about midway of 2,132 feet. Being separated from the Cecir range to the westward by Padaran gap, the land of cape Padaran has an isolated appearance when approached from the south-west and from the northward.

**LIGHT.**—From a white lighthouse, 33 feet in height, erected near the east extreme of cape Padaran, is exhibited at an elevation of 610 feet above high water, a *group-flashing white and red* light visible from a distance of 32 miles in clear weather. The light is cut off by the land when bearing eastward of N. 45° E.

The light shows *two white flashes and two red flashes* in alternate groups, interval between the flashes *three seconds*.

**The current** runs strong to the southward during the north-east monsoon, north-eastward of cape Padaran ; see page 29.

**Anchorage.**—There is anchorage in a depth of about 10 fathoms off a small bay close northward of cape Padaran in the south-west monsoon period ; the bottom is foul nearer the shore. Water may be found at the south side of the bay.

**FAN RANG BAY** lies between cape Padaran and Fan rang point ; about 7 miles northward of the cape, a church, near the coast, forms a good landmark. Fan rang river, on the north entrance point of which is situated the village of Mantung, lies 11 miles northward of cape Padaran ; the river is fronted by a reef, dry at low water, projecting some distance, and forms the south entrance point of Navan bay at the head of Fan rang bay.

Lat. 11° 31' N.  
Long. 100° 4' E.

**LIGHT.**—A lighthouse is in course of construction in Fan rang bay, but the character of the light to be exhibited from it is not yet decided ; the exact position of the building has not been promulgated.

General charts, 2,680a [2,678] and 2,681a [2,680].

**Navan bay.—Rocks.**—A small rock, awash, lies  $2\frac{1}{2}$  miles S.W. by W. of Fan rang point in the eastern approach to Navan bay, near the southern edge of the 5-fathoms line of soundings which continues one mile beyond, on the same bearing of the point; between the rock and the point there is a coral patch about one mile in extent, covered with only one foot of water at its eastern end. Haifong bank, extending about three-quarters of a mile from the northern shore at about a mile eastward of Fan rang river, has rocky heads upon it with less than 3 feet water over them.

Fan rang point is low, and surrounded by a sand bank dry at low water. There is a rivulet at the head of Navan bay.

Vessels working against the north-east monsoon find good anchorage near the head of Navan bay in 4 fathoms, good holding ground.

**Buoy.**—A conical mooring buoy, painted white, is moored off the entrance of Fan rang river in a depth of 4 fathoms, with the summit of the hill on the east side of entrance bearing N.  $1^{\circ}$  E., and Morne hill N.  $64^{\circ}$  W.

**Telegraph.**—There is a telegraph station at Khan Hoi, on the northern side of Navan bay.

**Directions.**—After passing cape Padaran, if bound to Navan bay, keep about three miles from the shore, to give a berth to the reef and foul ground, which extends a mile off shore for about  $2\frac{1}{2}$  miles northward of the cape; then continue to the northward, with North islet open of Fan rang point until Navan peak is in line with the Morne, bearing N.W.  $\frac{1}{2}$  N., which marks in line will lead to the anchorage.

**VUNG GANG BAY.**—The coast from Fan rang point to Davaich head is mountainous and steep. Vung gang bay, situated to the south-west of Davaich head, is difficult to distinguish from seaward on account of the high mountains which surround it; there are depths of 10 to 12 fathoms in the entrance, decreasing gradually to 3 fathoms within a cable of the shore at the head of the bay.

The bay is divided into two basins; the outer affords good protection at all times, and is easy of access. Heavy squalls occur at times, but the holding ground is good. There is a rock above water on the south side at about half a cable northward of Entrance island.

The inner basin, on the south side of which is the fishing village of Vink Hi, is 4 cables in length by 2 cables in breadth, with depths of 3 to 5 fathoms in the middle portion, which is about a cable in width.

**DAVAICH HEAD** (False Varella), the native name of which is Mui Davaich, rises steeply from the sea to a height of 1,014 feet and forms the eastern extreme of a range some 5 miles in length; this range attains a height of 3,114 feet in False Varella summit, on which is an

Charts, 1,261  
[2,697].  
3,028 [2,701].  
1,008 [2,700].  
Var. 2° E.

isolated rock or knob resembling that on the true cape. Eastward of the summit is a cone 2,490 feet in height. The cape slopes regularly from the summit and is wooded to the steep cliffs that front the sea. There is a rock above water close to the south extreme of the head and a depth of 17 fathoms within half a mile of the head.

Between the coast and the small island of Hon Chut, 391 feet high, which lies N.N.W. of the cape, is a narrow passage, but a ledge of only 2½ fathoms extends from the island to the mainland.

Milieu, a small islet, lies a quarter of a mile from the north-west point of Hon Chut, and from it a spit extends half way to the island, with a depth of one foot only on its outer edge. Three-quarters of a mile West of Milieu islet there is a shoal patch, 3 cables in length, with 9 feet water over its eastern end.

Lat. 11° 50' N.  
Long. 109° 12' E.

**KAM RANH BAY (Camraigne of the French)**, situated northward of Davaich head, between False Varella summit and a hill 1,542 feet in height, is one of the finest harbours on the coast of Annam; it is available for all classes of vessels, and offers secure anchorage at all times of the year. The bay is composed of an outer and inner port, and is surrounded by high mountains.

The main entrance between Tagne and De la Prise islands, is 1½ miles wide, with depths of 11 to 15 fathoms, and free from danger.

The northern entrance between Tagne island and the coast is but a cable wide which is further reduced by sunken rocks on both sides; it has a depth of about 3½ fathoms in the fairway and should only be used by small craft with local knowledge.

**Tagne island** is about 1½ miles in length in a north and south direction, and of the shape of a horseshoe; its summit near the south-west side is 916 feet in height. There are two rocks above water on its south-east side, and a small one on its west side.

**Anchorage.**—There are no hidden dangers in the outer harbour, and there is good anchorage in depths of about 10 fathoms, mud, about a mile N.W. of the north-west end of Tagne island; also in the bay on the north side of Tagne in depths of 7 to 8 fathoms.

**Inner anchorage**, or Kam ranh harbour, is a bay 8 miles in length by about 2 miles in breadth, with depths of 6 to 8 fathoms over a space 3 miles in length by about 1½ miles in breadth; it is free from shoals, and affords good and land-locked anchorage, over mud. The entrance is nearly three-quarters of a mile wide, with depths of 13 to 15 fathoms; the point on the east side is fairly steep-to, that on the west side is shallow to the distance of 1½ cables.

General chart, 1,342 [2,609].

**Shoals.**—The south-west head of the harbour has less than 3 fathoms Chart, 1,008 [2,700]. Var. 2° E. to  $1\frac{1}{2}$  miles off shore with a sunken rock just within the 3-fathoms edge. A rock, covered with 6 feet water, lies off Bangai, with South-west rock bearing North, distant 6 cables, and 2 cables northward of the same there is a coral head at a depth of 3 feet. There is also a coral head with 13 feet water over it situated with South-west rock bearing N. by W.  $\frac{1}{2}$  W., distant  $6\frac{1}{2}$  cables; and a rock at a depth of 6 feet, lying with South-west rock bearing W. by S.  $\frac{1}{2}$  S.,  $1\frac{1}{2}$  miles, northward of which banks front the shore to a considerable distance, for which see the plan.

From Verte point in the north part of the harbour, a river runs northward parallel to the coast for about 12 miles, to a marsh, separated from the sea by Dgai beach, a narrow neck of land, consisting of sand hills and a barren, sandy plain.

**Village.**—The harbour is mostly inhabited by fishermen; on the western shore is the village and fort of Bangai, where there is a telegraph station.

Some mountains lie about 3 miles within Bangai, the highest of which are La Pelé, 2,425 feet, and the Ass's back, 2,294 feet in height.

**Supplies.**—A dépôt for supplying coal and water is being established in Kam ranh bay; about 600 tons of Hongai and Japanese coal was stored here, by late information. Oxen, poultry, vegetables, and other provisions can be obtained.

**COAST.**—The east coast of the peninsula forming the east side of Kam ranh bay is mountainous and clifly, with rocks above water off it in places. Han Nai point, near the north-east extreme, is 522 feet in height, rocky and bare. During the south-west monsoon, anchorage can be obtained northward of the point forming the south extreme of Dgai beach which is backed by low sand dunes.

**Fisherman islands** are situated from 4 to 6 miles north-eastward of Han Nai point. The southernmost Hon Nai,\* a steep, sharp island, Lat.  $12^{\circ} 04' N.$  Long.  $100^{\circ} 18' E.$  is 394 feet high; the largest Hon Ngai, 361 feet high, has some islets and rocks near its extremes. Dgai beach, abreast Fisherman isles, is about 9 miles in length, and terminates at Dong ba point in the southern approach to Nha trang bay.

**Vulcan rock.**—This sunken danger is situated between Hon Nai and Hon Ngai, about 6 cables northward from Hon Nai.

**Castlereagh bank,** on which  $6\frac{1}{2}$  fathoms least water has been found, with bottom of sand and seaweed, lies nearly in mid-channel between Hon Ngai and Dgai beach; from the shoalest part Hon Ngai summit bears E.  $\frac{1}{2}$  S., distant  $3\frac{1}{2}$  miles.

**NOTE.**—This bank is reported to be situated north-westward of the position shown on the chart, and to have several coral heads of only

Chart, 1,008  
[2,700].  
Var. 2° E.

3 fathoms, which can be distinguished by discoloured water. These coral heads are said to be steep to.

The passage inside Fisherman islands is thought to be safe and to have depths of about 12 fathoms, avoiding Castlereagh bank.

**NHATRANG BAY.**—Five islands lie in the southern approach to Nhatrang bay, forming four channels between Lon island (Tre island) the largest and the mainland, all of which are available. The eastern approach is between Lon and Pyramid islands; and the northern between Pyramid island and Bourayne rock, or between the rock and Tortoise island, in all of which the water is deep.

Lat. 12° 11' N.  
Long. 109° 19' E.

**LIGHTS.—Lon (Tre) island.**—On the south-east point of Lon island, from a conical granite tower 48 feet in height, and at an elevation of 336 feet above high water, a *group-flashing white* light is exhibited showing *three quick flashes every fifteen seconds*, visible in clear weather from a distance of 24 miles, when bearing from N. 26° E., through north and west, to S. 11° E. The duration of the eclipse between each flash in the group is *three seconds*, between each group *nearly nine seconds*.

Lat. 12° 13' N.  
Long. 109° 12' E.

**Nhatrang bay.**—On the site of an old fort on Chut point, at the southern entrance of Nhatrang bay, a lighthouse is in course of erection; the character of the light to be exhibited therefrom has not yet been decided.

**Southern approach.—Dong ba point** on the mainland forms the west side of the southern approach; it is a bold cliff and the eastern termination of a mountainous ridge which separates the district of Kam Ranh from that of Nhatrang. La Tondu peak, 1½ miles within the point, is 2,198 feet in height, and 3 miles westward is the summit of the range, elevated 3,314 feet, and densely wooded. The bight northward of Tondu peak is foul.

**Kua Bé.**—Between Dong Ba point and Nhatrang is Kua Bé, an inlet almost blocked by a sand and mud bank, leaving but a narrow boat channel at low water to Truong Dong, a rather large village within, and distinguished by cocoanut trees and pagodas. Farther in is the village of Binh Tan. Several small streams discharge into Kua Bé, one of which connects with Nhatrang river.

**NOTE.**—There is a channel of the same name about 25 miles to the northward, page 432.

**Chut point** is the north point of entrance to Kua Bé. On its summit, 492 feet in height, are the remains of an Annamite fort. From this point the coast is a sandy beach backed by sand hills as far as the entrance to Nhatrang river. The village of Chut is situated at the

southern extreme of the beach ; here there is a Custom house. Many junks visit this place in the fine or south-west monsoon period.

Chart, 1,008  
[2,700].  
Var. 2° E.

**Lon island or Hon Lon,** is  $6\frac{1}{2}$  miles in length in an east and west direction by about  $2\frac{1}{2}$  miles in breadth. It is formed of three mountainous ridges connected by rather low isthmuses ; the eastern is 1,476 feet in height, the centre 1,640 feet, and the western 689 feet. From its south-east extreme a ridge of rocks extends about three-quarters of a mile ; one of these, named Nok islet, is 149 feet in height, and 8 cables from the extreme.

About 2 cables off the north-west extreme of Lon island is Black rock, above water ; a reef extends about 3 cables W.S.W. from it. Many of the points of the island and its bays are fringed with rocks to the distance of a cable or more in places.

The island is densely wooded and abounds in game ; and abundant harvests of swallows' nests are gathered in the fissures of its steep cliffs.

All the known dangers will be seen on the chart. There is a small village westward of Dam Lia bay, named Bai Tru, and another upon the tongue of shingle forming the entrance to Dam Chinh. No supplies are obtainable here. In the fishing season numerous fishing stakes encumber the approaches.

**Islets.**—The islets southward and westward of Lon, are Mung, 590 feet in height ; and Mot, Tam, and Mieu, each about 328 feet in height. High rocks lie at short distances from their coasts in many places.

These islands are inhabited with the exception of Mot.

**Toan channel** is the southern approach to Nhatrang bay, between Lon island and the mainland, northward of the above-mentioned islets.

The fairways between the islets are apparently free from danger with Lat. 12° 11' N.  
Long. 106° 15' E.  
the exception of Lion rock, about 160 yards in extent, which has a depth of  $2\frac{1}{4}$  fathoms, situated with the west extreme of Mot island, S. 66° E., distant 3 cables. The eastern summit of Triple peak kept open of Nam point, the west extreme of Lon, bearing N. 35° W., leads westward of Lion rock. From the south-east extreme of Mot island, a ledge partly above water extends about one cable.

**Anchorages.**—Two deep bays on the north side of Lon island, named Dam Lia and Dam Tre, afford secure anchorage during the south-west monsoon ; and two bays with a common entrance, on the south side of Lon, named Dam Lom and Dam Chinh, afford anchorage during the north-east monsoons.

The west side of Mieu island, and abreast Kua Bé, also afford good anchorages ; the first is much frequented by the junks calling for the birds' nests collected by the inhabitants, who are principally Chinese ; the anchorage

Chart, 1,008  
[2,700].  
Var. 2° E.

abreast Kua Bé is used by the mail steamers during the north-east monsoon period, the mails being landed at Kua Bé. There is also anchorage anywhere in Toan channel.

**Directions.**—Approaching Nhatrang bay from the southward, a vessel may pass on either side of the Fisherman isles, and enter by either of the channels between the islets into Toan channel; avoiding Lion rock if entering between Mot and Tam islands, the widest channel, the clearing mark for which is given above. Anchor where most desirable, according to the monsoon.

Lat. 12° 16 $\frac{1}{2}$ ' N.  
Long. 109° 24' E.

**NORTHERN APPROACH.** — **Pyramid or Dune island**, 754 feet in height, is steep-to, and bordered at the base of its cliffs by a narrow ridge of shingle. There is but little vegetation on it. Pyramid island forms a good mark for making Nhatrang bay.

**Kau island** is both lower and smaller than Pyramid and is destitute of vegetation; it resembles a ruined castle from the offing. Three rocks lie off its south extreme and one off its west extreme.

**Shala island**, situated about 4 miles northward of Kau island, is 525 feet in height and one mile in length. Depths around it are not known.

**Séche islet**, situated about a mile E.S.E. of Séche point, is very low, small, rocky, and flat.

**A rock** with 1 $\frac{1}{4}$  fathoms, the position of which is doubtful, is charted midway between the islet and Séche point.

**Grand bank.—Bourayne rock.**—This bank, situated between Pyramid island and Khe Ga point or Cock's crest, the north point of Nhatrang bay, is nearly 1 $\frac{3}{4}$  miles in extent with irregular depths. The shallowest water is on its north-western portion, where there is but 3 feet, named North-west rock. On its south-west portion is Bourayne rock\* with 4 feet water, with Pyramid peak bearing, E.  $\frac{3}{4}$  S., distant 4 $\frac{1}{4}$  miles. Irregular depths extend from this rock about half way to Pyramid island, to avoid which the whole of Bak island should be kept well open of cape Verte, keeping over towards Pyramid island, which is steep-to. If passing westward of Bourayne rock, keep well over towards Tortoise island.

\*Lat. 12° 17 $\frac{1}{2}$ ' N.  
Long. 109° 16 $\frac{1}{2}$ ' E.

**Tortoise island** is rocky, moderately high, and so named from its resemblance to a tortoise. Its eastern side is clear, but to the westward a sandbank extends a considerable distance. Between it and the main is a coral reef which obstructs the channel.

**White rock**, always above water, lies about one mile eastward of the north point of entrance to Nhatrang river; it is the head of a bank which extends nearly one cable south of it. At half a cable W.N.W. of

White rock there is a submerged rock covered with 6 feet water. Between White rock and the shore is Briere island, low and covered with bushes, from which shallow water extends about half way to White rock. Vessels should keep outside White rock.

**Khe ga point**, or the Cock's crest, the north extreme of Nhatrang bay, is high, wooded, and jagged; the summit within it is about 1,200 feet in height. The bay between it and Nhatrang river is foul to nearly one mile off shore in its northern portion, and the remainder is fronted by a coral ledge. About midway is a beach about half a mile in extent, affording good landing. Many wood-cutters' huts are situated in this bay.

**NHATRANG RIVER and anchorage.**—Nhatrang bay affords good anchorage everywhere during the south-west monsoon period, over sand and mud. A convenient position for vessels of light draught is in a depth of 5 fathoms, abreast the settlement, with the summit of Mot island touching the west extreme of Lon island, and the west extreme of Tortoise island in line with White rock. During the north-east monsoon the anchorages in Toan channel are used, as then there is considerable sea in Nhatrang bay. Landing is easily effected on the beach abreast, or by entering the river.

**The river** has a course of about 70 miles, chiefly through reeded banks, from whence it derives its name, and is navigable for boats and sampans for about 30 miles. About 7 miles from the mouth is Khanh Hoa, the capital of the province; an Annamite viceroy resides there.

The mouth of the river is fronted by rocks, some of which are above water, to the distance of about 3 cables. Between their south extreme and the shore the river discharges over a bar, in the fairway of which are two rocks, only visible at low water springs. Within the entrance points there is a pool with a depth of 8 feet at low water, and vessels of about 8 feet draught make use of it. The tide reaches about half way to Khanh Hoa.

**Settlement.**—The village of Ku Huan is situated on the low and sandy south point of entrance to the river, and is mostly inhabited by fishermen; near it is the French Residency, a small fort and other dwellings in connection with it. Within, on the river bank, is the large village of Xuong Huan, with groups of cocoanut trees. An isolated bluff, surmounted by a pagoda within the village is conspicuous from the offing, as are also other pagodas in the neighbourhood.

Lat.  $12^{\circ} 16'$  N.  
Long.  $109^{\circ} 11'$  E.

**Supplies.**—Eggs, fowls, vegetables, and fruit are obtainable at Ku Huan, abreast the anchorage off Nhatrang river. Bullocks may be procured through the agency of the Residency there.

Chart. 1,008  
[2,700].  
Var. 2° E.

**Tides.**—There is but one high water daily; its maximum rise is about 6½ feet, when the moon has its greatest declination; when the moon has no declination the rise is only about 1½ feet. The time of high water is said to be 3½ hours after Do Son, page 473; or at 8 h. 30 m. full and change.

**Winds.—Climate.**—During the south-west monsoon, the weather is fine at Nhatrang. Moderate south-east winds prevail, which calm down towards evening and give place to a cool land wind at night.

The months of June, July, and August are nowhere in Tong King as healthy and agreeable with regard to temperature as here. Cyclones are quite exceptional, although their distant effects are observed by a notable change in the appearance of the weather and the state of the sea.

During the north-east monsoon, rain falls in abundance, accompanied at times by a gale. The sea is always heavy and breaks strongly on all coasts exposed to the monsoon.

Lat. 12° 20' N.  
Long. 109° 15' E.  
**BIN KANG BAY or Vung Thuk** northward of Nhatrang bay, is a long inlet; the entrance is 3½ miles wide, with depths of 6 to 10 fathoms, which decrease to 5 and then to 3 fathoms in front of some islets. To the north-west of these islets is a marshy basin, in which there is generally not more than 5 feet of water. The islands and dangers in the approach are mentioned on the two preceding pages.

The bay affords good anchorage during both monsoons in depths as requisite.

The peninsula which separates the bays of Bin kang and Van Fong is formed of high wooded mountains, the summit being 2,788 feet in height; it is separated near Hon Kobe from the mountains of the interior by a low neck.

The bay between Seché point and cape Spec is blocked almost entirely by coral reefs, and must not be entered.

Tigers abound in this part of Annam.

**VAN FONG and BING KOI BAYS.**—Between the mountainous peninsula which forms the north side of Bin Kang bay and the Hon Gom peninsula, also mountainous, lies Van Fong bay, the main entrance to Bing Koi bay, which is available for all classes of vessels. The peninsula of Hon Gom is connected with the mainland by a low and narrow isthmus 5 miles in length, scarcely half a mile wide in places. On the peninsula are several high and rugged peaks, the most conspicuous of which is mount Dayot, 2,198 feet in height, and Table mount, 950 feet high, eastward of Dayot; in the southern portion, the Finger and mount Chauve are also conspicuous. On the mainland, about 16 miles from the

coast, is a remarkable peak surmounted by two rocks which have the appearance of fingers of unequal size, named Mother and Child; it is 6,890 feet high, and visible in clear weather from a considerable distance.

**Van Fong bay** is about 6 miles wide between the mainland and Kua island, with depths of 12 to 15 fathoms, mud. It has no known hidden dangers except a coral shoal  $4\frac{1}{2}$  cables long and 2 cables broad, with a depth of  $1\frac{1}{2}$  fathoms over it, lying  $2\frac{1}{10}$  miles S.  $32^{\circ}$  E. from Hon Kohe point. There is anchorage under Kua island, in the north-east monsoon period, but it is open to the south-west.

**Islands.**—There are several islands in Van Fong bay, the outermost of which, named Bak, rocky and bare, is 459 feet high. About a mile eastward of Bak is Button rock.

Between Bak island and the shore are Long, Middle, and Noire islands; from Middle island a reef extends more than half way to Long island. Between Middle and Bak islands there are depths of 14 to 16 fathoms apparently, but a rock with two pinnacle heads, covered by 6 feet water, lies about 7 cables S.  $12^{\circ}$  E. from the southern side of Middle island. A coral patch of small extent, with 4 fathoms, is situated on a line joining the east end of Bak island with cape Vert, distant nearly 2 miles from the latter.

Passage island, 65 feet in height, lies nearly a mile off the southern side of the west end of Kua island; it has a rock close off its north end and a patch of  $4\frac{1}{2}$  fathoms about 3 cables off its west side.

The coast between cape Vert and Hon Kohe point is reported to be incorrectly shown on the charts.

**Hon Kohe port**, on the mainland, just within Van Fong bay, is shallow, with depths of less than 3 fathoms  $1\frac{1}{2}$  miles from its head, and a patch of  $2\frac{1}{2}$  fathoms between the 3 and 5 fathoms lines. It affords anchorage and shelter for small craft in about  $3\frac{1}{2}$  fathoms, good holding ground. Up the creek at the head of the port is Hon Kohe village.

**Kua island**, on the east side of Van Fong bay, is wooded and mountainous, 8 miles in length, and with an average breadth of 2 miles; near its north-west extreme is mount Passage, a flat peak 1,870 feet high.

An islet lies a little west of its south extreme. North-west of Kua are several islets, the westernmost of which is Comete; see Dangers, page 432.

**Bing Koi bay**, within Van Fong bay, is 10 miles in length in a north-east and south-west direction, and about 5 miles in breadth, affording anchorage over a space 5 miles by  $2\frac{1}{2}$  miles, in depths of 6 to 9 fathoms, mud.

Chart. 1,008  
[2,700]  
Var. 2° E.

Its western shore is fringed by several islands, lying parallel to it, to the distance of about 2 miles, all within the 5-fathoms contour line; the head of the bay is shallow nearly out to North islet.

**Dangers.**—A patch of rocks, covered with about 4 feet at low water, lies  $1\frac{1}{4}$  miles eastward of Mangrove island, west side of entrance, with patches of  $2\frac{1}{2}$  and  $1\frac{1}{2}$  fathoms within one mile east and south-east of it; and there is a patch which dries one foot at half a mile W. by N. of Comete island, east side of entrance. There are depths of 7 to 9 fathoms between and around these dangers.

**Tides.**—It is high water, full and change, at about 11 h. 30 m.; springs rise about 5 feet.

**Directions.**—There are two entrances to Bing Koi bay, namely, that from Van Fong bay, which is 4 miles wide, in which are the patches before mentioned, and by Kua Bé, the narrow channel eastward of Kua island, which is deep throughout and seems to require no directions; Lion rock, in the entrance, off the south extreme of Hon Gom peninsula must, however, be given a berth.

To enter from Van Fong bay, the best route is to pass between Comete islet and patch (which dries at low tides) half a mile west of it; Da Bia peak, situated within cape Varella, kept in line with North islet bearing N.  $20^{\circ}$  E., leads in the fairway in about 9 fathoms.

Anchorage may be taken as convenient on that mark or near the peninsula. There are several fishing villages in the bay.

Lat.  $12^{\circ} 36' N.$   
Long.  $109^{\circ} 23' E.$

**KUA BÉ** is the channel which separates Kua island from Hon Gom peninsula; it is a third of a mile wide in its narrowest part with depths of not less than 11 fathoms throughout. Both sides of the channel are formed by high and wall-sided land, and small craft may warp in and fasten to the trees almost anywhere, as it is free from danger within Lion rock. It is the eastern entrance to Bing Koi bay, as before stated. There is an inlet of the same name just south of Nhatrang bay, page 426.

**Lion rock** on the east side of the entrance, with 8 feet water, lies about 2 cables S.  $30^{\circ}$  E. from the south extreme of Hon Gom peninsula, and has depths of 30 fathoms around it.

**Port Dayot** is the name of the bay within Kua Bé, formed in Hon Gom peninsula; there are only a few fishing villages hereabouts, and it is apparently but little frequented. A coral reef of small extent, with a depth of 5 feet over it, lies at a distance of  $1\frac{1}{4}$  cables, S.  $78^{\circ}$  W. from the north extreme of Adran island.

**COAST.—The Three Kings**, about 20 feet high, consist of a Chart, 1,008 [2,700]. group of eight rocks, well above water, lying about one mile eastward of Lat.  $12^{\circ} 34' N.$  the south extreme of Hon Gom peninsula; sunken rocks extend about Long.  $109^{\circ} 26' E.$  Var.  $2^{\circ}$  E.  $2\frac{1}{2}$  cables northward of them. There is a depth of 20 fathoms or more between these rocks and the coast.

**Hon Gom bight.**—About 5 miles northward of the Three Kings, and close to a point of the mainland, lies the small island Doi Moi; both the island and point are fringed by sunken ledges, with a practicable channel between, but it is not recommended.

Hon Gom bight, 3 miles north-westward of Doi Moi, affords good anchorage in a depth of 8 or 10 fathoms, south-eastward of a small island. The sandy flat, which connects the high land of the peninsula with that southward of cape Varella, is only half a mile wide in some places, separating the head of Bing Koi bay from the sea as before stated; the islands in that bay may, in passing, be seen over it.

The eastern or seaward side of the sandy flat has not been surveyed.

**Vung Ro or Ro bay**, lies southward of the high land of cape Varella and is formed by the peninsula extending some 3 miles southward of that cape. It is about 2 miles in length by one mile or more in breadth, with a depth of 10 fathoms at the entrance, decreasing gradually over a clay bottom towards the village at its end; it is free from danger. The land is high all round it.

Vung Ro is one of the safest harbours on this coast, and being near the inshore route up and down the China sea, is much resorted to in bad weather by the trading junks. No directions are necessary for entering it.

Many fishermen and wood-cutters reside on its shores. Tigers and elephants are numerous in the forests.

**Water.**—On the west side of the harbour fresh water may be procured in several places, but the best watering place is about half way up on the same side, to the north-eastward of a cove.

**Hon Ro**, 360 feet high, an island about half a mile in extent, situated in the approach to Vung Ro, is bordered on its sea face by high perpendicular cliffs, steep-to; on its western side is a shingle beach with a fishing village; its south end is prolonged by a ledge of rocks partly under water, to the distance of one cable.

Vessels anchor between the island and Khanh hoa Gia, the beach on the mainland, during the south-west monsoon or fine weather period. The great Mandarin road passes at the back of this beach, and also the telegraph line from Hué to Saigon.

Lat.  $12^{\circ} 55' N.$   
Long.  $109^{\circ} 26' E.$   
Var.  $2^{\circ}$  E.

**CAPE VARELLA** (Mui Nai) or Pagoda, is formed of steep cliffs, with four rocky peaks, extending nearly north and south for  $3\frac{1}{2}$  miles, having in the middle a small sandy bay, where a stream of good water descends from the mountain into the sea; it is safe to approach, there being depths of 20 to 25 fathoms at a short distance.

The cape rises sharply to its summit, elevated 2,395 feet above high water, 2 miles within, on which is a conspicuous rock, resembling a pagoda, named Da bia by the natives; it may be seen from a distance of about 50 miles in clear weather, but the summits of the mountains are frequently obscured by clouds or vapours, particularly in the north-east monsoon.

**LIGHT.**—On the point south of cape Varella, from a circular granite tower 46 feet in height, painted white, and at an elevation of 318 feet above high water, a *group-flashing white* light is exhibited, showing *two short flashes* at intervals of *three seconds* every *twelve seconds*, and visible in clear weather from a distance of 24 miles, between the bearings of N.  $2^{\circ}$  W., through west, and S.  $4^{\circ}$  E.

**Anchorage.**—There is anchorage northward of the cape in the south-west monsoon period, about half a mile off a cove, in a depth of about 10 fathoms, with Da Bia summit, bearing S.W.  $\frac{1}{2}$  W.

There is good fresh water in this cove, and also in the creek southward of the north-east point of the rocks forming the cape.

**Perforated rock.**—About 4 miles N. by W. from cape Varella lies a mass of rocks, some of them just awash; but the central rock is higher, with a large stone on its summit; in passing near it, when abreast, a hole through will be perceived near the top which has given it the name of Perforated rock. There are depths of about 20 fathoms between it and the mainland.

Lat.  $13^{\circ} 5' N.$   
Long.  $109^{\circ} 15' E.$

**Kua Da Rang.**—The coast becomes low northward of cape Varella; at the first rocky point there are low wooded hills with a village north of it. Thence to Kua Da Rang the coast is formed of low sandhills, with regular depths of 12 to 14 fathoms at about a mile from the shore.

A plain some 30 miles broad extends back to the mountains.

Kua Da Rang enters the sea between Mamelon or Nipple hill to the southward, and a mound on which are the ruins of a pagoda to the northward; the river flows through the extensive plain at the back, and is accessible to junks, but it has not yet been explored. Both points of the entrance are foul to some distance.

There is anchorage off the river in about 9 fathoms. The winds are fairly strong on this coast during the greater part of the year.

**Coast.**—Northward of Kun Da Rang, as far as Xuan Dai point, the Var.  $2^{\circ}$  E. coast is chiefly low and sandy, interspersed with rocky points and sand hills, and with outlying islets and rocks in places. The plain within is well cultivated. The principal landmarks near Kua Da Rang are Epervier peak, an isolated and sharp hill, 1,312 feet high, at about 2 miles from the coast, and Cone hill, 1,870 feet in height, at about 7 miles north-west of it.

**Bai Ma Lieng islands**, two in number, and surrounded by rocks, lie off the first rocky promontory northward of Kua Da Rang. The nearer to the shore is Verte island, bare, and 131 feet in height. The other has a single tree, and is named Coco island. Between these islands is a rocky bank with a rock about 3 feet high. Rocks also extend one cable north-east and westward of Verte island, and southward of Coco island. A reef of rocks covered at high water lies about 3 cables northward of Verte island, and the same distance from the coast.

**Lam Tui**, a thriving village, is situated on the mainland abreast Verte island. There is anchorage here for small craft in the south-west monsoon, the fine weather period.

The large fishing village of Chun Bien is situated near the north extreme of the beach between Bai Ma Lieng islands and Bonnet island.

**Bonnet island**, 197 feet in height, is small, black and rugged in appearance, and connected to the point on the mainland which separates the sandy beaches, by a reef.

**The Trapeze** is a black and prominent rocky point between Bonnet island and Mai Nha island. It is 360 feet in height, and fronted by a reef, steep-to, on which the sea generally breaks. The coast northward is composed of low sandhills, interspersed with points of black rock here and there; a few scattered huts may be seen under clumps of coconut trees.

**Mai Nha island**, 394 feet in height, situated about  $1\frac{1}{2}$  miles from the coast, is wooded, irregular in outline, and resembles the roof of an Annamite house, hence its name. It is inhabited, and also frequented by fishermen from the neighbouring coast. Rocky ledges front the points of the island to some distance. The channel between the island and the mainland is reduced to 6 cables in width by the ledge from the island, and by the ledge extending  $2\frac{1}{2}$  cables from the main shore, uncovered at about half ebb. During the summer months the channel is blocked by fishing nets.

**Olang lagoon**, on the mainland, between Mai Nha island and Xuan Dai point, is about  $5\frac{1}{2}$  miles in length, and situated at the back of

Chart, 3,010  
[2,702].  
Var. 2° E.

the coast sandhills. Its shores are well cultivated and populous. The southern entrance is a little northward of Mai Nha, and dries about half a foot at low water springs, which will give a depth of about 6 feet at high water springs. Within the bar is a pool with about 7 feet at low water, abreast the village of Tan Kwi. The lagoon is only available for boats, and at high water there is a boat channel to Xuan Dai.

The northern entrance is situated in a bend in the coast, southward of the southern extreme of Xuan Dai point, off which there is temporary anchorage for small craft. This entrance, like the southern, has from 6 to 7 feet at high water springs.

**Fu Son**, within the northern entrance to Olang lagoon, is a small harbour with about 2 fathoms at low water, fronting the town of Fu Son. A Chinese colony is formed here in the midst of the Annamites, and there is considerable coasting trade between this port and the ports in Canton province. The numerous pagodas on this coast, and the table-topped hill 443 feet in height near Fu Son, render the bay and entrance easily recognisable. The tidal rise is about 6 feet at ordinary springs.

Lat. 13° 24' N.  
Long. 109° 15' E.

**FUYEN BAY**, also named Dayot, from the name of the province, is the finest in Annam. It has several anchorages, the principal of which are Xuan Dai on the south side of the entrance; Vung la on the north side, available for large vessels according to the monsoon; Vung Lam within Xuan Dai, and Vung Chao port, the northern arm of the bay; the latter affords good and sheltered anchorage over a considerable space in a depth of 4 fathoms, mud, easy of access.

The principal landmarks are the peaks of Vung Chao peninsula, the high and cliffy point Gain Ba, and the high hills around Vung Trikh.

The country around Fuyen is well cultivated, and on its shores are many landing places for the fishermen. There are numerous villages dotted about, surrounded by cocoanut groves and backed by high ranges of hills forming a magnificent landscape. The province is very prosperous, and its capital is situated in the interior, south-westward of the bay.

The entrance to Fuyen bay is about 2 miles wide, between Xuan Dai point and Vung Chao peninsula, with depths of 9 to 10 fathoms on either side of Nids island.

**Xuan Dai point**, the south point of entrance, like the rest of the country hereabout, is well cultivated. Its southern extreme is a black and rocky bluff, with a ledge of coral and isolated rocks extending seaward about a quarter of a mile. Thence northward towards its extreme detached rocks front the coast, which is moderately high.

**Vung Chao peninsula**.—The southern portion of the peninsula, forming the north-easterly side of Fuyen bay, is a mountainous ridge with

three peaks. The southernmost, lower than the others, is conical; the other two are each about 1,181 feet in height. Chart, 3,910  
[2,702].  
Lat. 13° 28' N.  
Long. 109° 18' E.

**Vung la point**, the southern termination of the peninsula, is a perpendicular cliff about 230 feet high. Var. 2° E.

**Gain Mong point**, about three-quarters of a mile to the north-eastward, has a rock above water about one cable off it. The bight between these points is foul, except at its north extreme. Its sandy shore is divided by a black bluff.

**Gain Ba point** is a peninsula connected to the larger one by a sand isthmus; it has two sharp peaks of nearly equal height, about 656 feet. Rocks, some above water, extend about one cable seaward of the southern peak, with deep water beyond them. Lat. 13° 28' N.  
Long. 109° 18' E

Vessels may find temporary anchorage in the bays on either side of the point, but much obstructed by fishing stakes or nets; in the southern one is a fishing village.

**Dangers.—Ilissus rock** is about 250 yards in length in a N.N.W. and S.S.E. direction, and 160 yards in breadth, within a depth of 5 fathoms; the least depth, 5 feet, is at its north-west extreme, from which Xuan Dai point bears N. 58° W., distant  $1\frac{1}{4}$  miles, and is in line with the north peak of Rocheux island. The rock has depths of 12 to 13 fathoms around and about 11 fathoms between it and the shore. Lat. 13° 21' N.  
Long. 109° 17' E.

**Clearing marks.**—The whole of the Pulo Gambir seen open of Gain Ba point, bearing North, leads eastward or seaward of the rock. The whole of Rocheux island well open of Xuan Dai point leads northward, and the eastern peak of cape Varella a little open westward of the west extreme of Mai Nha island, bearing S. 17° E., leads between the rock and the shore.

**Nids island** is a small clifly island situated in the entrance to Fuyen harbour, at about one mile north-westward of Xuan Dai point. A reef with  $2\frac{1}{2}$  fathoms, extends a cable from its west side.

**A patch** of  $2\frac{1}{2}$  fathoms lies with Nids island bearing E. by N.  $\frac{1}{3}$  N., distant 6 cables.

**Rocheux island**, about half a mile in length and 174 feet in height, forms the south-east side of Vung Lam road; a considerable reef extends south-west of it, and the channel between it and the mainland has only a depth of 3 feet at low water. There is a rock above water off its north-east extreme.

**Volga rock**, with a depth of  $2\frac{1}{2}$  and  $2\frac{1}{2}$  fathoms over two rocky heads, 85 yards apart, lies in the fairway to port Vung Chao, with the summit of Rocheux island bearing S. 19° W., distant  $5\frac{1}{2}$  cables; it has depths of 5 to 6 fathoms around it.

Chart. 3,010  
[2,702].  
Var. 2° E.

**Bouée rock** barely covers at the highest tides and is therefore nearly always discernible; it lies 8 cables north-eastward of Volga rock, with South Vung Nie point bearing E.  $\frac{1}{4}$  N., distant 4 cables.

The channel between these rocks is the best route to Vung Chao port, the inner anchorage.

Lat. 13° 23' N.  
Long. 109° 14' E.

**Outer anchorages.—Xuan Dai** anchorage is convenient during the north-east monsoon, the fine season, and affords anchorage in a depth of 6 fathoms, mud, with the mouth of the river bearing S.  $\frac{1}{4}$  E., and Nids island N.E. by E.  $\frac{1}{4}$  E., avoiding the 2½-fathoms patch westward of the island before mentioned.

The river has several arms, but is only available for boats. Provisions are obtainable at Xuan Dai village.

**Vung La.**—Anchorage may be taken also under the peninsula, off Vung la, in from 7 to 8 fathoms, about half a mile south-west of the village of the same name. Small craft can careen in the cove northward of the village.

**Vung Lam road** has anchorage in a depth of 4½ fathoms with Ronge point bearing North, and the north extreme of Rocheux island S.E. by E.  $\frac{3}{4}$  E.; from thence the depths decrease gradually towards the shore. Vessels of heavy draught should anchor farther off. Rocheux island may be rounded at the distance of about 2 cables, but the head of the bay is shallow for a considerable distance. At the village, supplies of provisions are obtainable.

Ving la bay and islet lie northward of Vung Lam road; the bay is very shallow, with a village on its north shore. Jaune peak, 440 feet in height, lies southward of this bay.

Lat. 13° 27' N.  
Long. 109° 14' E.

**PORT VUNG CHAO**, the head of Fuyen bay, is about 3½ miles in length by about the same in breadth, with an entrance about a mile wide; it has depths of about 4 fathoms over a considerable part of it, and is therefore available for vessels of moderate draught. It may be considered a typhoon anchorage.

**Rouge point** is the west point of entrance to port Vung Chao; a rock with 2½ fathoms lies 1½ cables S.S.E. of it, and one, that dries 5 feet, and therefore nearly always visible, lies 80 yards eastward of the point.

**Pluvier reef** in the centre of the port is about 4 cables in extent; its north-east part dries 4 feet, and other parts about 2 feet; it has depths of 2½ to 3 fathoms around it. A reef, a third of a mile in length, dry at low water, lies about from 3 to 5 cables off the north side of approach to Vung Chao village. Its north extreme is connected with the shore reef to the northward, by a ridge nearly dry at low water.

**A patch** which dries, lies 7 cables S.W.  $\frac{3}{4}$  S. of Rouge island, 85 feet high, at the head of the port. Chart, 3,010 [2,702]. Var. 2° E.

**Directions.**—The best approach, having passed Ilissus rock, if coming from the southward, is between Nids island and Vung Chao peninsula; thence steering to bring Xuan Dai point in line with the west side of Nids island, bearing S. 43° E., which mark astern will lead midway between Volga and Bouée rocks; the latter is almost always visible. When within these dangers, bring the rock off the north-east end of Rocheux island to bear S. 8° E. astern, which mark leads to the anchorage off the principal village, Song Kau, on the western side of the port, and westward of Pluvier reef, where there is anchorage in about 3 fathoms. The south-eastern part of the port has rather deeper water.

**Settlements.**—Vung Chao is situated on the east side of the port. The principal village is Song Kau on the western shore, through which the main road between Hué and Saigon runs.

**Supplies.**—The branch mail steamers call here (*see page 414*), and supplies of provisions can be procured. Water is obtainable near the village in the bay south-west of Vung Chao, and in Vung la creek, and probably at Song Kau.

**Tides.**—The rise of tide in Vung Chao port, at springs, is about 6 feet.

**Vung Trikh.**—From Gain Ba point northward, the coast forms a deep sandy bight nearly 3 miles in length, backed by sandhills about 120 feet in height, and a table-topped hill above them highly cultivated. At the north extreme of this bight, is a rocky peninsula nearly  $1\frac{1}{3}$  miles in length and 371 feet in height, the north extreme of which forms the south point of entrance to Ku mong harbour.

Within Vung Trikh point, the south extreme of this peninsula, is Vung Trikh bay, which affords anchorage in the fine weather season in a depth of from 3 to 5 fathoms, at from 2 to 3 cables off shore, and temporary anchorage in the north-east monsoon period for small vessels when the wind does not blow in.

The village of Vin Hoa is situated at its head under a group of cocoanut trees. The village of Vung Trikh is situated in the plain to the westward.

**Ku mong harbour.**—Close northward of the rocky peninsula is the entrance to Ku mong harbour, both points of which are foul to the distance of a cable. The channel between is very narrow, but is said to have a depth of 8 fathoms; just within it is reduced to 4 and 3 fathoms, mud bottom, affording secure anchorage for small craft. All the western portion of the harbour is shallow. A mark for the fairway of the entrance

General chart, 1,342 [2,609].

Chart, 3,010  
Var. 2° E.

is Verte hill, a saddle hill covered with vegetation, situated about  $1\frac{1}{4}$  miles south-westward of Vung Trikh point, bearing S.  $5^{\circ}$  W., until well within the entrance points. Thence the fairway course is about S.S.W., or for a group of cocoanut trees just visible above the sandhills, anchoring where desirable. There is a depth of  $3\frac{1}{2}$  fathoms in a pool southward of Ku mong island.

Within and northward of Ku mong harbour is a large lagoon, from whence quantities of salt are obtained, many steamers calling here for it.

**The village** of Ving ho is situated among the cocoanut trees on the north shore of the harbour.

**Vung Mong point**, like that of Gain Ba, has a bay on each side, with a fishing village in the northern one; a vessel intending to anchor there must give a berth to the northern extreme of the point, as rocks project from it above and under water, having 10 fathoms close to them; the anchorage also is in a depth of 10 fathoms.

**Pulo Kambir or Gambir**, situated about 4 miles north-eastward of Vung Mong point, is narrow, about 2 miles in length, and has two peaks about 360 feet in height, visible about 18 miles in clear weather; there are a few fishermen's huts on the south-west side. A ridge extends  $2\frac{1}{2}$  cables southward of its south-west point, with a depth of 3 feet on its extreme. Some sharp-peaked rocks, named the Two Paps, lie about a mile south-east of Pulo Kambir.

Lat.  $13^{\circ} 36' N.$   
Long.  $109^{\circ} 20' E.$

**LIGHT.**—On the summit of the eastern point of Pulo Kambir, a white group flashing light, showing groups of four quick flashes every fifteen seconds is exhibited from a white circular granite tower, 52 feet high, at an elevation of 387 feet above high water. The light is obscured by the land from the bearing of S.  $44^{\circ}$  E. to S.  $79^{\circ}$  E.; it is visible from all other directions in clear weather from a distance of 26 miles.

**Pâques**, a coral bank with 2 fathoms water over it, lies  $1\frac{1}{4}$  miles from the west side of Pulo Kambir, with the north point of the island bearing N.N.E.  $\frac{1}{2}$  E., and the Paps in line E. by S.  $\frac{3}{4}$  S. There is a safe passage on either side of this bank.

**Hon Dat**, lying about 6 miles N.N.W. of Vung Mong point, and one mile distant from the mainland, is of round form, and covered with trees. Between it and another round island nearer the shore there is a passage with a depth of 5 and 6 fathoms, and there are some rocks above water to the northward of the latter island. From Vung Mong point to opposite Hon Dat the coast is steep and mountainous, forming Kambir or Gambir bay.

General chart 1,342 [2,600].

**KIN HON or THI NAI HARBOUR**, lies between the high peninsula of Huong Mai, and the extreme of a neck of sand about  $1\frac{1}{2}$  miles in length, on which is a fort and some villages; it forms a secure anchorage for such vessels as can cross the bar.

The entrance is half a mile wide between the points, but it is reduced to about a cable by a crescent-shaped spit extending a third of a mile from the west point. It is fronted by a bar at a quarter of a mile seaward of South point, on which there is a depth at low water of 11 feet, and at high water springs about 16 feet, subject to change during freshets or strong winds. The s.s. *Bengali*, in 1903, is reported to have carried 15 feet least depth over the bar at low water, with the west side of K hill (295 feet) bearing N.  $2^{\circ}$  E.

Within the bar there are depths of 5 to  $6\frac{1}{2}$  fathoms over a length of a mile by a quarter of a mile in breadth. Northward of Gia spit the harbour opens out to a shallow lagoon, about 2 miles in length and breadth; several streams discharge into it, one of which communicates with the city of Kin hon, situated about 15 miles to the westward, and the capital of the province of the same name.

**LIGHT.**—From an iron gibbet 30 feet high on South point, entrance to Kin hon harbour, a *fixed white* light is exhibited at an elevation of 178 feet above high water, visible at the distance of 7 miles in clear weather. The light is obscured over the land between the bearings of S.  $55^{\circ}$  W., through west, and N.  $58^{\circ}$  W.

**Outer anchorage.—Directions.**—The entrance to the port is easily recognised; *see* view on plan. The state of the bar should be ascertained before attempting to enter. There are no pilots.

A vessel not intending to go into the harbour may anchor outside the bar in a depth of 4 fathoms, good holding ground, with cape San ho, the south-east extreme of Huong Mai peninsula, bearing E.  $\frac{1}{2}$  N., and the flagstaff on the east entrance point N.N.E. This anchorage is not recommended during the north-east monsoon period.

The best water over the bar in January 1898 was 17 feet, with the cocoanut trees on the extremity of Gia point bearing North. Having crossed the bar, when a yellow patch, situated near the battery north-eastward of South point battery, is just open of South point, bearing N.E. by E., steer N.E. until the inner entrance point on the eastern side of the channel bears N.  $\frac{3}{4}$  W., when steer for that point, and then pass one cable westward of it to the north-west part of the harbour.

The harbour is subject to a strong downward current in the rainy season which much reduces its security at that time, which is also the

Chart 264 [2,703].  
Lat.  $13^{\circ} 45\frac{1}{2}'$  N.  
Long.  $109^{\circ} 13\frac{1}{2}'$  E.  
Var.  $2^{\circ}$  E.

Chart, 3,010  
2,702].  
Var. 2<sup>3</sup> E.

is Verte hill, a saddle hill covered with vegetation, situated about  $1\frac{1}{2}$  miles south-westward of Vung Trikh point, bearing S.  $5^{\circ}$  W., until well within the entrance points. Thence the fairway course is about S.S.W., or for a group of cocoanut trees just visible above the sandhills, anchoring where desirable. There is a depth of  $3\frac{1}{2}$  fathoms in a pool southward of Ku mong island.

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General chart 1,342 [2,600].

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The entrance is half a mile wide between the points, but it is reduced to about a cable by a crescent-shaped spit extending a third of a mile from the west point. It is fronted by a bar at a quarter of a mile seaward of South point, on which there is a depth at low water of 11 feet, and at high water springs about 16 feet, subject to change during freshets or strong winds. The s.s. *Bengali*, in 1903, is reported to have carried 15 feet least depth over the bar at low water, with the west side of K hill (295 feet) bearing N.  $2^{\circ} E.$

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Chart 264 [2,703]. typhoon season. The best position then would be well up into the lagoon, Var. 2° E. away from the narrow entrance.

Loading can only be carried on before noon during the north-east monsoon period, as fresh breezes with considerable sea prevail after that time.

**Railway.**—A railway is under construction from Kin hon to Tourane and Hué; also another line inland to Attopeu.

**Water.**—Good water can be obtained from a stream on the east shore of the harbour.

**Tides.**—The time of high water, full and change, in Kin hon, is irregular; springs rise about  $4\frac{1}{2}$  to  $5\frac{1}{2}$  feet, neaps 2 to  $3\frac{1}{2}$  feet.

**Villages.**—The village of Gia is situated on the spit on the western side. Eastward of it is the establishment of the French Resident. There is also a fort on the spit.

There is a look-out station on the hill eastward of South point, and a battery with flagstaff on South point.

**A jetty** has been constructed on the seaward side of Gia peninsula,  $5\frac{1}{2}$  cables westward of the cocoanut trees at the harbour entrance.

**Trade.**—The population of the port of Kin hon is 3,000, of which about 20 are French civilians. The chief articles of export are: salt, silk-capes, beans, sugar, &c. A considerable trade is carried on with Hong Kong, Singapore, Saigon, Haifong, &c., chiefly in the hands of the Chinese. Fresh provisions are cheap (1898), but water is not obtainable.

Lat.  $13^{\circ} 45' N.$   
Leng.  $109^{\circ} 15' E.$

**COAST.**—**Cape San Ho**, situated about  $2\frac{1}{2}$  miles eastward of the entrance of Kin hon harbour, is a high bluff headland, forming the eastern point of Kin hon bay. At one mile north-eastward of the cape, is Kulao Han island, connected to the shore by a reef; two other islands lie within its northern end. Thence the coast to Vung Bak point is steep and high. About  $2\frac{1}{2}$  miles north of Kulao Han is a remarkable gap between two hills 994 and 554 feet in height. Vung Bak point is rocky and moderately high, with some rocks lying off it.

**Hon Kan** (Juan Prieto) 295 feet high, is a steep pyramidal rock, lying  $1\frac{1}{2}$  miles E. by N. of Vung Bak point; and two miles farther east there are some rocky islets, named Koni or Black Jack islands, about 120 feet high. Vessels may pass between these and Hon Kan, and also within the latter, there being 15 to 20 fathoms water around them. During the south-west monsoon there is good anchorage in the south-west corner of the bay abreast these islets.

**Vung Tang.**—For 5 miles northward of Hon Kan, the coast forms a bay backed by sand hillocks to the rocky promontory of Vung Tang,

which rises to a height of 2,231 feet at 3 miles within it. This peak, and var. 2° E. the one 2,887 feet in height, 4 miles north-westward, have each a single rock on the summit.

On the coast, at 2 miles southward of Vung Tang, is a conspicuous cone 689 feet in height; to the northward the coast is high and rocky to Nuok Ngot.

**Nuok Ngot**, a prominent headland, 590 feet in height, and steep-to, Lat. 14° 8' N.  
Long. 109° 12' E. has several peaks of reddish granite, on the slopes of which are streaks of sand which serve to identify the point. In the bay to the southward is a stream of fresh water, and a village off which vessels can anchor in a depth of 8 to 10 fathoms. Northward of the point is a plain bordered by sand dunes, with isolated hills in places.

**Buffalo island** (Hon Tran), 4 miles distant from Nuok Ngot, is a barren granite rock with two peaks, about 98 feet high. Two detached rocks lie about 2 cables east of Hon Tran, with a breaking rock between them and the island. A tide-rip was observed near the west point of Hon Tran, but no bottom was found at a depth of 16 fathoms all around the island. Between it and the shore the depths are said to be regular, from 12 to 14 fathoms.

**Vung Moe**, at 6 miles northward of Nuok Ngot, is a small bay, in which there is a village and a stream where fresh water is obtainable. Within the village are two hills, one of which has a table-top.

**Nuok islet**.—From Vung Moe the coast trends eastward about one mile to a remarkable cliff, off which are several black rocky islets; the largest, Nuok islet, lies one mile north-east of the cliff, and has two peaks, the eastern being 150 feet high. The channel which separates these islets from the mainland is encumbered with rocks.

Anchorage can be obtained, in the north-east monsoon, off the village in Vung Moe in a depth of 5 fathoms, sand, at half a mile from the shore. During the south-west monsoon there is good anchorage to the northward, under shelter of the islets, in  $8\frac{1}{2}$  fathoms. It is necessary to pass one mile northward of Nuok islet on account of the rocks which extend from it in that direction.

At 3 miles north of the village of Vung Moe is a rocky point from which the coast, bordered by sandhills, trends north-westward to the mountain, forming An Yo point.

**Hara** is a small black islet, 33 feet high, lying 1 miles off the sandy coast already mentioned. A reef extends three quarters of a cable northward of it.

**Octavia rock**.—The steam-vessel *Octavia*, on her passage from Bangkok to Hong Kong, 1881 (drawing 18 feet), after passing between

General chart, 1,348 [2,600].

Chart 264 [2,703]. typhoon season. The best position then would be well up into the lagoon. Var. 2° E.

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**Vung Moe**, at 6 miles northward of Nuok Ngot, is a small bay, in which there is a village and a stream where fresh water is obtainable. Within the village are two hills, one of which has a table-top.

**Nuok islet**.—From Vung Moe the coast trends eastward about one mile to a remarkable cliff, off which are several black rocky islets; the largest, Nuok islet, lies one mile north-east of the cliff, and has two peaks, the eastern being 150 feet high. The channel which separates these islets from the mainland is encumbered with rocks.

Anchorage can be obtained, in the north-east monsoon, off the village in Vung Moe in a depth of 5 fathoms, sand, at half a mile from the shore. During the south-west monsoon there is good anchorage to the northward, under shelter of the islets, in  $8\frac{1}{2}$  fathoms. It is necessary to pass one mile northward of Nuok islet on account of the rocks which extend from it in that direction.

At 3 miles north of the village of Vung Moe is a rocky point from which the coast, bordered by sandhills, trends north-westward to the mountain, forming An Yo point.

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**Octavia rock**.—The steam-vessel *Octavia*, on her passage from Bangkok to Hong Kong, 1881 (drawing 18 feet), after passing between

General chart, 1,342 [2,600].

Chart, 1,005  
[2,704].  
Lat. 2° E.

Hara islet and the mainland, struck on a rock, reported by her to be in lat.  $14^{\circ} 30' N.$ , but without further information as to its position, and for which no regular search appears to have been made. It is placed on the Admiralty charts in the marginal position, or 4 miles N.N.W. of Hara islet.

**An Yo point** is formed by two rocky spurs projecting from a summit, 2,624 feet high, lying to the south-westward. A village lies south of the southern spur, and a little distance off the northern one are some rocks.

About a mile southward of An Yo point there are two submerged rocks, half a mile off shore, with a least depth of 11 feet over them and  $5\frac{1}{2}$  fathoms around; vessels must pass outside.

From An Yo point the coast northward is sandy.

**Tifu river** enters the sea in the middle of the sandy coast; there is a village on it surrounded by palms. The anchorage off it is in a depth of 7 to 8 fathoms, sandy bottom. At 2 miles west of the river is a hill with a reddish summit and about 11 miles to the northward, north-west of Tam kwam, is a flat summit, 2,854 feet high.

Lat.  $14^{\circ} 35' N.$   
Long.  $109^{\circ} 3' E.$

**Tam Kwam river** discharges at the northern extremity of the sandy coast, at the foot of a series of hills which terminate in Tam Kwam point; the bar at the entrance is passable only by boats at high water. The anchorage, in 7 fathoms, mud and sand, is partly sheltered from northerly winds by the coast stretching out about one mile eastward from the north side of the entrance. There is a village on its banks surrounded by plantations of cocoa and areca nut, where some provisions can be procured. A pagoda, encircled by trees is situated on a small hill.

The coast from Tam Kwam point trends northward 5 miles to cape Sa hoi, and presents alternately rocky points and sandy bays; thence northward to cape Batangan the coast is backed by sand dunes of much the same character; that named Mia 197 feet in height, at 10 miles from Sa hoi, and one of 200 feet in height 4 miles southward of the Black rock, and 7 miles from the Kwang nai river, are the only noticeable ones. There is a rock close under Mia hill, and from the northern (200 feet) sand hill a bank fronts the shore as far as cape Batangan to about half a mile, otherwise the coast is bold to approach. The country is high inland. There is temporary anchorage off the Kwang nai river in about 7 fathoms.

Lat.  $15^{\circ} 15' N.$   
Long.  $108^{\circ} 54' E.$

**Cape Batangan**, about 6 miles north-north-east of Kwang nai river, is high. At  $2\frac{3}{4}$  miles S. by E.  $\frac{1}{4}$  E. from the cape lies Flat rock, showing just above high water; and  $1\frac{1}{8}$  miles N.N.W.  $\frac{1}{4}$  W. from this rock lies Indre rock, covered with 15 feet water.

In the bay north of the cape there is good anchorage in the south-west monsoon in  $5\frac{1}{2}$  fathoms, with the rocks off the cape bearing East. [2,704] Var.  $2^{\circ}$  E. A rock, which dries 3 feet and is surrounded by depths of  $5\frac{1}{2}$  fathoms, lies half a mile off the shore in the northern end of this bay, about  $4\frac{1}{2}$  miles N.W.  $\frac{1}{2}$  N. from cape Batangan.

**Cape Bantan.**—The coast from Batangan trends north-westward for 12 miles to cape Bantan, which is 502 feet in height; there are several high and salient points between, off which there are depths of 20 to 25 fathoms at a short distance. In the interior are several ranges of mountains.

**KULAO RAI** (Pulo Canton), about 15 miles eastward of cape Bantan, is nearly 3 miles in length, east and west, and  $1\frac{1}{4}$  miles in breadth. It is formed of several craters and peaks, appearing isolated when seen from a distance of 25 miles, but has a level aspect when viewed from the southward.

The island is surrounded by a coral reef, which extends a mile from the north-west and south-east points; and to the northward there are overfalls and rocky bottom, extending about 3 miles from it. North island, which is low and rocky, lies  $2\frac{1}{2}$  miles north of its west extreme, with deep water between.

The north-east sides of these two islands should not be closely approached, for although it is not known that any danger exists, overfalls in depths of 7 fathoms have been experienced about 8 or 9 miles to the northward of Kulao Rai.

The holding ground is rocky and bad everywhere, but temporary anchorage may be taken on the south side of Kulao Rai, as shown on the chart.

**LIGHT.**—From a grey pyramidal tower, 165 feet high, situated about 2 cables within the north-east point of Kulao Rai, and at an elevation of 172 feet above high water, a *white flashing* light is exhibited showing *one very short flash every five seconds*; it is visible in clear weather from a distance of 20 miles between the bearing of N.  $50^{\circ}$  E., through north, west, and south, to S.  $82^{\circ}$  E. Lat.  $15^{\circ} 23\frac{1}{4}'$  N. Long.  $100^{\circ} 6'$  E.

**Villages.**—There are villages on the west and south sides of Kulao Rai, and fresh water is procurable; the island is well cultivated.

The wide channel between Kulao Rai and the mainland is clear with the exception of Volta bank, and has a depth of about 30 fathoms.

**Volta bank**, discovered in 1874, on which there is a depth of  $2\frac{1}{4}$  fathoms, coral, lies, approximately, N.W.  $\frac{1}{2}$  N.  $7\frac{1}{2}$  miles from the north-west extreme of Kulao Rai. Lat.  $15^{\circ} 29\frac{1}{4}'$  N. Long.  $108^{\circ} 59\frac{1}{4}'$  E.

Chart. 1,005  
[2,704].  
Var. 2° E.

**Caution.**—It may be proper to observe that sailing vessels adopting the inner passage to China, during the strength of the south-west monsoon, in June, July, and August, ought not to edge off from the coast of Cochin China until they pass within sight of Kulao Rai, particularly if the winds are light and baffling. In such case it is advisable to steer well to the northward towards the south part of Hainan, to prevent being driven near the north-west extremity of the Paracels, should a north-westerly storm happen to blow from the gulf of Tong King, which has been frequently experienced in June and July.

Lat. 16° 25' N.  
Long. 108° 45' E.

**KI KIK BAY**, or Vung Kit, on the west side of cape Bantan, close to the foot of high hills, is about 6 miles in length and 3 miles in breadth. A bank with less than 3 fathoms fronts the shore to the distance of 4 or 5 cables, towards which the depths decrease gradually from 12 fathoms at 2½ miles off. There are some rocky islets on the eastern side of the bay near Inner point. The-Kan river, the mouth of which is shallow with several rocky islets in it, discharges into the south-east part of the bay. In the west corner of the bay is the village of Bai ran at the foot of a hill, and off the point to the northward are two rocky islets.

At 12 miles inland is the summit of the range which trends nearly parallel to the coast, being 3,707 feet in height and named Grand Ki Kik.

**Anchorage.**—During the south-west monsoon, good anchorage can be obtained in the south-east part of the bay. A large vessel should anchor in a depth of about 8 fathoms, south-west of Inner point; a small vessel could anchor nearer the shore in 3 to 4 fathoms, well sheltered. Anchorage can also be taken during the south-west monsoon, off Bai ran village, in 6 fathoms, sand, at three-quarters of a mile from the shore.

Water can be obtained in the creeks, or at the watering place north of Bai ran, but here the coast is steep and rocky.

Lat. 15° 30' N.  
Long. 108° 30½' E.

**Hapoix or Little bay.**—Westward of the north-west extremity of Ki Kik bay there is a shallow bay under cape Hapoix, into which the river Hapoix or An hoa discharges; it is encumbered with several sunken reefs and is only available for boats or junks. A sunken ledge extends about a mile N.W. of cape Hapoix, at which distance it breaks occasionally. At the mouth of the river is the village of Fu Xuan. This river runs northward parallel to the low sandy coast, from which it is distant 2 miles, for about 30 miles, where it connects with the Fai fo.

**The coast** northward of cape Hapoix is apparently free from danger, the depths decreasing gradually towards it; villages occur here and there; in the interior are several high mountain chains.

**Hon Ong.**—About 18 miles northward from cape Hapoix, and 14 miles off the coast, lies Hon ong, a round island 656 feet in height, about half a mile in diameter, and steep-to. Chart. 1,010  
[2,705].  
Lat. 15° 48' N.  
Long. 108° 40' E.  
Var. 2° E.

**KULAO CHAM** is an island 1,230 feet high, situated 11 miles north-westward from Hong ong, and about 7 miles from the mouth of the Fai foh river; it is visible from a considerable distance in clear weather and forms a useful landmark for vessels making Tong King gulf. It is about 4 miles in length north-north-west and south-south-east, and  $1\frac{3}{4}$  miles in breadth, having some islands adjoining its south-west side, and others between 2 and 4 miles westward from its north-west side. The island is inhabited and well cultivated.

**Anchorage.**—The east and north coasts are steep, but the bay on the west side affords good shelter during the north-east monsoon, with a convenient watering place, the anchorage being in a depth of 4 to  $4\frac{1}{2}$  fathoms, sand and mud, good holding ground. Lat. 15° 57' N.  
Long. 108° 28' E.

**D'Entrecasteaux rock or Ran man**, situated 8 cables westward of South island, has a least depth of  $1\frac{3}{4}$  fathoms; within the depths of 5 fathoms it is 5 cables in length by 3 cables in breadth, and steep-to around. From the shallow head the west extremes of North and Goat islands are in line, and the south peak of South island bears E. by N., distant  $1\frac{1}{2}$  miles. North-west island, open westward of South-west island, leads westward of the rock.

**The outer anchorage.**—South-east of Goat or Middle island is a bank of sand and mud, a mile in extent in a north-west and north-east direction, with a least known depth of  $2\frac{1}{2}$  fathoms near its centre, from which South-west island bears W.  $\frac{1}{4}$  S., distant one mile. Small craft may anchor on this bank in 4 to 5 fathoms, well protected during the north-east monsoon. There is anchorage in 8 to 9 fathoms, sand and mud, southward of the bank, with the extremes of Kulao Cham bearing N. by W.  $\frac{1}{4}$  W. and E.  $\frac{1}{4}$  N.

**Tides.**—The tides are feeble, except during springs, and then there is only one high water in 24 hours, which occurs about 9 a.m. The flood runs to the S.S.W. Springs rise about 4 feet.

**Fai foh or Kua Doi river.**—The entrance of the Fai foh lies south west of Kulao Cham, and is 2 cables in breadth between a low sandy point to the east and a higher point to the west, on both of which there is a fort; the masts of the junks at anchor inside are visible from the offing. Lat. 15° 53' N.  
Long. 108° 22' E.

A shifting bar of sand extends nearly one mile off its entrance, with about 5 feet over it at low water. Vessels should anchor well off the entrance in depths of 8 to 10 fathoms, as the holding ground is bad.

Chart, 1,010  
[2,705.]  
Var. 2° E.

A branch of this river, the Song Thu Bon, connects with Tourane bay via Tourane river; and another branch with Hapoix to the southward, as before stated.

The river is much frequented by junks, which carry on a considerable trade with places inland, the principal of which is Kuang Nam, the capital of the province.

**Tides.**—The times of high water, are irregular, the springs rise about 4 feet; the flood sets southward in the offing.

**The coast** from the Fai fo h is low, trends north-westward, and forms with the peninsula of Tien sha a large bay, in the middle of which there is a mass of marble rock, conspicuous when sailing along the coast.

Plans on chart,  
1,342 [2,699].

**TOURANE BAY. — Tien sha peninsula. — Cape Tourane,** is the eastern extreme of Tien sha peninsula that forms the east side of Tourane bay. This peninsula is about 6 miles in length in an east and west direction, and is mountainous, attaining a height of 2,059 and 2,183 feet at its north and south extremes, respectively. The isthmus connecting it with the mainland is low and its eastern side is steep-to. (See View A on chart 1,342 [2,699].)

**Canton rock**, awash at about low water, lies nearly 2½ cables off the north extreme of the peninsula. It is marked by a black conical buoy, surmounted by a cylindrical topmark. Vessels should pass outside this rock.

Lat. 10° 8' N.  
Long. 108° 18' E.

**LIGHT.—Tien sha.**—On the eastern side of Tien sha peninsula, from a white cylindrical masonry tower 28 feet high, and at an elevation of 518 feet above high water, a *group-flashing white light* is exhibited every *ten seconds*, showing thus:—Flash, *one-tenth of a second*; eclipse, *two and a half seconds*; flash, *one-tenth of a second*; eclipse, *seven and three-tenths seconds*. The light is visible in clear weather from a distance of 20 miles from the bearing of N. 39° W., through west and south, to S. 53° E.

**Kulao Han**, a clifly island, about a mile in length, and 853 feet in height, lies on the north side of the entrance to Tourane bay, separated from the point abreast by a channel nearly 4 cables wide, with depths of 13 to 14 fathoms. A patch of 2 fathoms lies near the fairway, about one cable from the island; there are some rocks above water, and a patch of 2½ fathoms nearer the shore northward of it; the west side of the channel is clear. The island is steep-to on its seaward side.

**Tourane bay**, between Tien sha peninsula and the point within Kulao Han, is 3½ miles wide in the entrance, with depths of 11 to 12 fathoms, sand and mud. Within the entrance it is 6 miles in length and the same in breadth at its head, towards which the depths gradually

decrease. There are no dangers outside the 5-fathoms line, which at the mouth of the river extends  $1\frac{1}{2}$  miles off, decreasing to half that distance towards the western part of the bay, within which are some patches of 2 fathoms.

The head of the bay is low, but the northern shore is mountainous, attaining a height of 3,970 feet at the Ass's ears some 7 miles within.

**LIGHTS.**—**Observatory light**, *fixed white*, shown from the North fort at the west extreme of Tien sha peninsula, is exhibited from a white masonry tower, with triangular top-mark 16 feet high, at an elevation of 136 feet above high water. It is visible in clear weather from a distance of 5 miles when bearing from S.  $28^{\circ}$  W., through south and east, to N.  $62^{\circ}$  W.

**Breakwater lights.**—*Fixed white* lights are shown from each extremity of the West breakwater, and at the outer end of the East breakwater, both situated off the entrance of the Tourane river.

Two other *fixed white* lights are exhibited from piles placed near the edge of the shoal water extending westward, distant about three-quarters of a mile from the West breakwater.

These lights must not be absolutely relied upon, as they are only lighted when the state of the sea permits.

**Leading marks.**—On the beach, about  $1\frac{1}{3}$  miles west of Tourane river entrance, is a white conical stone turret, with triangular topmark, 18 feet high, at an elevation of 49 feet above high water.

A similar turret, with cylindrical top-mark, 29 feet high, is situated S.  $32^{\circ}$  E.,  $3\frac{1}{4}$  cables from the above.

**Tides.**—It is high-water, full and change, in Tourane bay, at about 9h. 30m.; springs rise 4 feet; there is only one tide in the 24 hours, at springs.

**Directions.**—The high peninsula of Tien sha and Kulao Han will identify Tourane bay; there are no known dangers in the approach, other than Canton rock, awash, at 2 cables from the north shore of the peninsula, and which will be generally visible. Round either points of the entrance at a prudent distance, and steer for the anchorage, with the beacons in line; bring up north-west of, and clear of, the red mooring buoy.

**Anchorage.**—The best anchorage is in the east part of the bay; vessels of light or moderate draught may anchor at 3 to 4 cables southward of Observatory fort, in about 4 fathoms, mud, or mud and shells,

Plans on chart,  
1,342 [2,699].  
Var. 2° E.

with protection from all winds. Vessels of deep draught must anchor south-west or west of the Observatory fort, in depths of 6 to 8 fathoms, a more exposed position during the north-east monsoon period. The depths are said to be about three-quarters of a fathom less than those charted.

Observatory fort island is joined to the shore by a reef of rocks upon which is a roadway.

**Tourane river** is obstructed by a shifting bar which extends about a mile seaward of the entrance, and it is often unnavigable during the north-east monsoon period. It has a depth of about 4 feet on it at low water springs, and from 12 to 16 feet within; the channel is usually marked by stakes. The river is navigable for junks and other small craft to the coal mines at Nang son, 28 miles from the entrance. At 14 miles up a branch connects with the Fai fo. It is contemplated to dredge a channel through the bar of the Tourane river.

Lat. 16° 4' N.  
Long. 108° 12' E.

**The town** of Tourane is situated on the west point of the river entrance, with a river frontage of about 2 miles. It possesses many public buildings, including the French Residency, a fine military hospital, barracks, custom house, public offices, and a number of well-appointed business establishments. A wharf, 110 yards long, 29 feet wide, and with a depth alongside it of 23 feet at low water, is to be constructed at Tourane.

**Trade.**—The trade is considerable, and several steamers arrive from Hong Kong every month, taking full cargoes of sugar, rattans, bamboo, areca nut, silk, cassia, &c.; about a dozen enter every month, in addition to a large number of junks.

**Population** in 1897 was 4,650, of whom 100 were Europeans.

**Supplies.**—Ordinary supplies of provisions are procurable, but vegetables are scarce. Ships' stores can be purchased. Water for drinking can be obtained, but that from the river is only suitable for washing purposes. There is a stream of good water close to Observatory island.

**Coal** is brought down from the extensive mines near Nong son; it is transported by tramway to the river, and thence in sampans to the coal store on Observatory island, where about 2,000 tons are kept in stock. The native coal is of fair quality and gives good results when mixed with Welsh coal, but it is of no use for ships by itself. It is proposed to build a pier out from Observatory island, 345 feet long, to berth vessels of 18 feet draught. The Messageries Maritime steamers coal here.

**Repairs.**—A workshop provided with various machines is being established for executing small repairs.

**Communication.**—The branch vessel of the Messageries Maritime calls here *en route* from Saigon to Hong Kong, bi-monthly. There is a

good road to Hué, distant 68 miles. A railway is under construction from Tourane to Hué, also a line southward to Kin hoa harbour. Chart, 284 [2,703].  
Var. 2° E.

**Climate.**—The climate is healthy during the north-east monsoon period, when fresh breezes prevail. In February squalls occur, warning of which is given by the clouds collecting on the mountains to the northward. The remainder of the year is hot, and exposure to the sun should be avoided. In April and May the heat is stifling and calms prevail. At this time vessels should anchor well out in the bay away from the high land of the peninsula for the benefit of any light airs that may be experienced there. In June land and sea breezes prevail. Rain is abundant at all times, especially at the beginning of the north-east monsoon, and it is a rare event if a typhoon is not experienced in the months of September or October.

**The COAST** from Kulao Han\* off the north point of Tourane bay Lat. 10° 13' N.  
Long. 108° 11' E. is rocky as far as the mouth of Fu Ya lagoon, a distance of 6 miles, beyond which, to Chumai east cape it is low. From Chumai west cape the coast north-westward to Hon Tseu, a distance of about 140 miles, is known to the Annamites as the "iron coast"; it is a low sandy coast with sand hills in places, and backed at a considerable distance inland by high mountains which are often enveloped in fog. It offers no anchorage during the north-east monsoon period, but in the opposite season vessels may anchor anywhere in suitable depth; there are no known sunken dangers.

**East Cape Chumai**, situated 12 miles north-westward from Kulao Han, is the extremity of a steep and wooded peninsula, 820 feet high, united to the coast by an isthmus of sand. Lat. 10° 21' N.  
Long. 108° 0' E.

**Tua moi bay** lies between Chumai east and west capes; the latter has two peaks, 1,640 and 2,000 feet in height. At the head of the bay is a nearly straight sandy shore, and the village of Chumai, which is visible from the offing; two small rivers discharge at the extremes of this beach, and fresh water can be procured at the eastern one.

Anchorage can be obtained in this bay under the east cape, in a depth of 7 fathoms, good holding ground, but when the north-east monsoon is fairly established it is hardly tenable.

**Truoi lagoon.**—Close westward of Chumai west cape is Tu Hien pass the mouth of Truoi lagoon, which connects with Hué river, near Thuan an; at low water there is only 3 feet of water on the bar, and there is apparently no more in the lagoon. West of the entrance are two hills; the one near the shore is 492 feet in height, the other is cone-shaped.

**HUÉ RIVER APPROACH.**—Between West cape Chumai and Hué river the coast is formed of sandhills, the summits of which are

Chart, 264 [2,703], covered with villages, surrounded by trees and cultivated fields; a peculiarity, which will prevent mistaking this part of the coast for that north of Hué, where the villages are on the sides and not on the summits of the sandhills.

Lat.  $16^{\circ} 33' N.$   
Long.  $107^{\circ} 37' E.$

The position of the river may be identified by Fort Nord with a flag-staff, situated about  $1\frac{1}{2}$  miles south-eastward of the present newly-formed entrance, and by the beacons for leading over Thuan An bar in the deepest water.

**Anchorage.—Thuan An.**—There is a good anchorage about  $1\frac{1}{2}$  miles N. by E.  $\frac{1}{2}$  E. from Fort Nord in a depth of 8 fathoms, sand, but it is very insecure during the north-east monsoon. This anchorage is known as Thuan An, from the name of the settlement that recently existed about one-third of a mile westward of the fort; *see below*. There are no dangers in the approach.

**LIGHT.**—It is intended to exhibit a *fixed white light* at the entrance to Hué river.

**Beacons.**—In order to avoid damage to the submarine cables, four beacons have been erected to indicate the anchorage, two on the east point of the entrance and two others a mile to the westward. The intersection of the lines of beacons, namely, S.  $10^{\circ}$  E. and S.  $37^{\circ}$  W., indicates the anchorage a little outside the 10-fathoms line.

**Buoys.**—Two telegraph buoys are moored 2 cables apart about  $1\frac{1}{2}$  miles northward of Fort Nord.

**Hué river.—Depths.**—A complete change has recently occurred in the position of the Hué river approach, the former entrance having completely closed, and a new channel formed about  $1\frac{1}{2}$  miles westward of the former by a way being forced through the Thuan An peninsula. The settlement and hospital have disappeared, only Fort Nord remaining. Hué river is about one cable wide in the entrance channel, with a depth of about 9 feet at low water, and is fronted by a bar nearly a mile in width and extending that distance seaward, on which there is about the same depth, subject to great and frequent alteration. There is considerable sea on the bar during the north-east monsoon period, causing it to break, and it may be then considered impracticable.

During the south-west monsoon period, vessels of 12 feet draught may enter in charge of a pilot; the last of the flood is the proper time to enter. Craft of 5-feet draught can go up to Hué; the river is much encumbered with sand banks and fishing stakes. In February the river is at its lowest, and in November at its highest. The stream is strong both on the bar and in the river.

**Pilots.—Bar signals.**—The services of a native pilot can be obtained. He generally boards the vessels outside the bar in the fine season (south-west monsoon); the pilots keep the best channel marked with bamboo poles.

The under-mentioned signals are made from Fort Nord flagstaff:—Four balls indicate that the bar is in good condition. Three balls that it is practicable. Two balls that it is practicable with difficulty. One ball that it is dangerous.

**Beacons.**—The bar is marked by leading beacons, in line when bearing S.  $42^{\circ}$  W.; there are other beacons for the channel further in.

**Caution.**—As the bar is constantly changing, vessels should not attempt to cross without the aid of a pilot, or recent local knowledge.

**Tides.**—It is high water, full and change, in Hué river at noon; springs rise  $1\frac{2}{3}$  to 5 feet.

**The City of Hué, or Hué Fu,** situated about 12 miles from the mouth of the river, is the capital of the kingdom of Annam, and the residence of the king. It is composed of two parts, the inner and the outer town; the latter, where the mass of the population resides, has probably about 50,000 inhabitants; the inner town is a large square fortress, built after Vauban, according to the plans of the French engineers, and having six gates, within this enceinte reside all the Government officials. The river encloses it on two sides, besides a canal 130 feet wide, by which it is entirely surrounded.

Lat.  $16^{\circ} 29' N.$   
Long.  $107^{\circ} 33' E.$

The principal Europeans are the French Resident, his staff and guard consisting of 300 French soldiers.

**Communication.**—The mail steamers call at Tourane, page 450, to which place there is a good road. They may also call off here, but it is not so stated; the bar is usually impracticable in the north-east monsoon period.

**Weather.—Climate.**—At Hué the maximum temperature in summer is about  $101^{\circ}$ , and the minimum during winter  $57^{\circ}$ .

The rain commences in May, and continues till August, September, or October. The heat during summer is often very trying, and the cold during December, January, and February is very keen, disagreeable, and accompanied by fogs. September, October, and November are mild. The variations of temperature are very sudden.

**COAST.**—The coast north-westward of Hué to cape Lay, a distance of about 45 miles, is a sandy plain with fishing villages here and there on the coast, as before stated; the only distinguishing marks are the mountains in the interior, some 25 miles distant, the principal of which is Double peak,

Var. 2° E.

5,940 feet in height, often hidden in the clouds or by haze. Midi peak, 2,297 feet in height, lies seaward of it at about 13 miles from the coast, and nearer cape Lay, about 15 miles from the coast, is Cachalot peak, about 2,300 feet in height, with the Tiger's tooth, 4,260 feet in height, about 10 miles within it.

There are no dangers off the coast, excepting a patch of  $4\frac{3}{4}$  fathoms at  $2\frac{1}{2}$  miles off shore and 6 miles S.S.E.  $\frac{3}{4}$  E. from cape Lay, so that the land can be approached by the lead.

Lat.  $10^{\circ} 54' N.$   
Long.  $107^{\circ} 11' E.$

**Palms river, or Kua Viet** enters the sea at about 13 miles southward of cape Lay, and can be entered by boats during the south-west monsoon period.

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General chart, 1,342 [2,609].

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## CHAPTER XIII.

### TONG KING GULF.

**General remarks.**—Tong King gulf is the great bight comprised between the parallels of lat.  $17^{\circ}$  and  $22^{\circ}$  N., the coast of Tong King on the west and the peninsula of Lei chau and the island of Hainan, on the east. The entrance between cape Lay and the south-west part of Hainan is about 120 miles wide, which is the general width of the gulf itself. Several islands lie contiguous to the western shore, and numerous small islands and shoals at its head. The depths are from 45 to 40 fathoms in the middle of the gulf, decreasing towards either shore; the bottom is generally soft, and suitable for anchorage.

**Fishing stakes,** consisting of several long poles weighted at the bottom with large stones, are met with occasionally from 25 to 30 miles from the land.

**Vigias.**—On the shores of the gulf and of Hainan island large patches of muddy water resembling banks are seen at times, but on examination deep water is almost invariably obtained.

**Tides.**—The tides on the coast of Tong King are subject to a large diurnal inequality, one high and one low water generally occurring in the 24 hours. At springs the high tide occurs in the evening in the summer and in the morning in winter, with a rise of about 8 to 10 feet. See Do Son tides, page 473. The tidal wave comes from the southward.

For further information see Chapter I.; also for winds in the gulf, &c.

**CAPE LAY** is rocky, about 70 to 100 feet high, covered with vegetation, and has a cluster of rocks projecting from it. The south side of the cape is cliffy, and in a small creek is a fishing village named Ving Banh. The church of Di Loan (Kua Lung) is a good mark for vessels in the neighbourhood. On the north side of the cape are red and yellow cliffs, and some rocks about half a mile from the shore; west of these cliffs is a large, bare sand hill. Dong Hoi church (lat.  $17^{\circ} 29'$  N.) is conspicuous and forms a good landmark for vessels near the place. Cape Lay is the only rocky projection between Chumai cape and Da Nhai point on the parallel of  $17^{\circ} 40'$  N., a distance of about 114 miles.

**Tiger island,** distant about 13 miles E. by N.  $\frac{3}{4}$  N. from cape Lay, is about a mile in extent, 230 feet in height, and visible in clear weather

Lat.  $17^{\circ} 54'$  N.  
Long.  $107^{\circ} 54'$  E.  
Var.  $2^{\circ}$  E.

Var. 2° E.

at a distance of 20 miles. The island is fringed with rocks, principally on its north and west sides, where the ground slopes towards the sea; the south point is cliffy, and has a large detached rock. The bottom around the island is rocky and uneven. The channel which separates it from the coast is clear, with 20 to 23 fathoms water; along the coast there is generally from 12 to 16 fathoms, blue mud, or mud and sand.

When abreast of Tiger island during fine weather, the whole range of mountains from Double peak, to the south, to the peaks in the neighbourhood of Kua Dong Hoi can be seen. The most conspicuous of the range are a high peak 3,675 feet high, lying 25 miles W.S.W. of cape Lay, and more to the southward a jagged mountain named Tiger's tooth.

**The COAST** from cape Lay continues in a north-westerly direction for 37 miles to Kua Dong Hoi, and is sandy and low, with villages and a few palms in places.

A bank of 8 to 9 fathoms is charted as extending about 4 miles off shore at 9 miles north-westward of cape Lay.

A little southward of the Dong Hoi, the mountains, which are wooded, approach nearer the coast, with several isolated and rugged summits, namely the North and South cones, the Three Summits, and the Nose 2,362 feet in height; these form an amphitheatre in the neighbourhood of the river. More inland may be seen the jagged peaks of another range, with the Great Summit, flat-topped, and 5,446 feet in height. The mountain chain continues northward of the Dong Hoi, gradually receding from the coast and becoming lower.

Lat. 17° 30' N.  
Long. 106° 36' E.

**Kua Dong Hoi.**—The south point of this river projects more than the chart indicates. Near this point is a pagoda, and the cross of a Roman Catholic church may be seen beyond; on the north point are the ruins of a fort; these serve to identify the entrance.

The bar at the entrance has apparently about 10 to 11 feet at high water springs; within it there are low water depths of about  $2\frac{1}{2}$  fathoms abreast the town, as far up as the Residency landing. Rocks covered at high water extend some distance off the north point below the fort ruins. Small craft cross the bar by steering for the north point, bearing W.S.W., until the Roman Catholic church is midway between the entrance points, thence for the church.

The bar is probably but rarely available during the north-east monsoon season. There is good anchorage off it in the fine weather or south-west monsoon season.

Upon the west bank of the river is the town of Dong Hoi, or Kwang Binh Dinh, formerly a place of some importance.

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General chart, 1,342 [2,600].

**Railway.**—A railway is under construction, which will connect Vir. 2° E. Dong Hoi with Tourane and Kin hon to the southward, and with Hanoi to the northward.

The coast from Kua Dong Hoi trends north-westward about 12 miles to Da Nhai point, and is sandy with low cliffs in places; it is backed by sandhills. A rock which dries 6 feet lies 2 miles north of the mouth of Kua Dong Hoi, abreast the first of these cliffs. At 2 miles farther is another cliff of red colour, then a wooded mound fronted by a rocky point, and one mile to the north, upon the Kua Li Hoa, a small stream, is the village of Li Hoa, a centre for the curing of fish. The lower slopes of the mountains, and the plain behind this part of the coast, are cultivated, and the summits are wooded.

**Da Nhai point**, lying one mile northward of Li Hoa, has two Lat. 17° 40' N.  
Long. 106° 29 $\frac{1}{2}$  E. rocky points edged with sand; a white pagoda lies at the foot of the northern. The mountains approach the coast here and with the point form a promontory, rendering it easily recognised.

The coast from Da Nhai to Vung Chua is lined with sandhills, and borders a large plain.

**Kua Gianh**, 2 miles northward of Da Nhia point, is fronted by a bar which is steep-to, to the distance of half a mile or more, on which there is a depth of about 3 feet at low water; it is available for boats during the fine season.

Mi Hoa is the village on the left bank, and Kuang Khe that on the right bank; they are of no importance.

The coast thence to Kua Ron is low and sandy; within is a vast plain, cultivated and inhabited. Marble mount is an isolated peak on the plain, within which are the mountains in the distance.

**Kua Ron** is situated near the north extreme of the sandy shore, at about 5 miles south-west of Vung Chua. The north point of this river is fronted by a reef extending about half a cable; the channel in, only available for junks at high water, is along shore southward of the mouth, and is about half a cable in width. The tidal stream runs strong but the sea is broken by the north point reef; it is probably only practicable in the fine season.

Two villages are situated on the south bank, Kam Gianh and Ron; the former is nearer the mouth and has some trade. The Mandarin road and the telegraph lines from Hué to Hanoi, &c., pass through Ron, but there is no telegraph office.

**Reef.**—At 2 miles east of Kua Ron is a coral reef, which dries 3 feet Lat. 17° 52 $\frac{1}{2}$  N.  
Long. 106° 28' E. at low water; this reef is connected with Hon Tu ut reef. Hon Tu ut

Var. 2° E. lies half a mile south-westward of cape Vung Chua and is apparently wooded.

Lat. 17° 57' N.  
Long. 106° 29' E. **CAPE VUNG CHUA (BUNG KIUÀ)**, easily known by its large red spots, is formed of elevated land, the two wooded summits of which each attain a height of about 3,380 feet at 6 and 10 miles within it. There is a pagoda on the cape.

**Anchorage.**—There are two islands near the cape, forming the anchorage of Vung Chua; Hon La, the eastern of these two islands, is 384 feet high; Hon Kau, between it and the cape, is smaller. Between these there is a narrow channel with 5 fathoms water, and a narrow and shallower passage between Hon Kau and the cape.

The anchorage of Vung Chua, the only place along this coast where protection can be obtained during the north-east monsoon, affords good holding ground. A vessel can anchor in a depth of 3 to 5 fathoms, muddy bottom, under shelter of the islands, with the summit of Hon Tseu seen between the cape and Hon Kau, bearing N. 20° W. Hon Dio should be kept open by vessels of moderate or deep draught. There is a fishing village, surrounded by verdure at the head of the bay, which is bordered by a sandy beach.

Hon Tu ut, or Boissieux island, to the south-westward, has two peaks; on its western side is a sunken reef from which a ridge, with from one to 2½ fathoms over it, connects the island with the reef off Kua Ron.

Lat. 17° 51' N.  
Long. 107° 2' E.

**Doubtful shoal.**—A shoal of 10 fathoms, the position and even the existence of which is doubtful, is stated by Horsburgh to be situated in about the position given. It was unsuccessfully searched for by the French vessel of war *Lutin*, in 1888, and is not shown on French charts.

Lat. 17° 55' N.  
Long. 106° 38½' E.

**Hon Dio (South Watcher)**, situated 9 miles E. by S. from cape Vung Chua, is a rugged rock, 272 feet high, and steep-to; there is a depth of 17 fathoms at less than a cable from its western side, decreasing to 8 or 9 fathoms near the islands off the cape.

**THE COAST** northward from cape Vung Chua is rocky. One mile north of the cape is a projecting point, 1,000 feet in height, and about 2 or 3 miles north-west of this are two low points, thence a sandy coast trends north-north-westward 6 miles, to the promontory of Mui Duong, the summit of which is 1,148 feet high. On the sandy coast mentioned are several isolated clumps of trees, and at 3 miles southward of Mui Duong is the village of Eo.

Lat. 18° 7' N.  
Long. 106° 24' E.

**Mui Duong** is steep-to and rocky, rising to a height of 574 feet immediately over it, and to 1,148 feet 3½ miles to the south-westward, and is a prominent object. There is but little vegetation on the cape.

**Hon Tseu or Hon Duong**, three-quarters of a mile in length Var.  $2^{\circ}$  E., east and west, and wooded, lies  $1\frac{1}{2}$  miles south-east of Mui Duong. Seen from the eastward it appears like two pointed hummocks, with a perpendicular cliff towards the north, and sloping to the south-west. Its east peak is 476 feet high.

A reef, which partly dries, extends 4 cables from its south-east point; and a reef, about half a cable wide, with 6 feet over it, and steep-to on its north and south sides, extends  $2\frac{1}{2}$  cables W.S.W. from its west extreme.

The channel which separates Hon Tseu from the coast has uneven bottom, and the sea has been seen to break there.

**Anchorage.**—There is good anchorage, in a depth of 5 fathoms, mud, half a mile south of Hon Tseu. The reefs which project from its extremes shelter this anchorage, but in the north-east monsoon the swell would be considerable.

**Hon Chim**, 112 feet high, is a rocky islet, with a number of pointed peaks, lying  $1\frac{1}{2}$  miles E.N.E. of Hon Tseu, with a depth of  $6\frac{1}{2}$  to 10 fathoms between.

**Aspect.**—The coast between cape Mui Duong and Hon Né, a distance of 120 miles, forms a regular curve, composed in general of sandy plains backed in the interior by high ranges of mountains. These mountains which touch the coast at cape Vung Chua, curve westward and thence northward, somewhat similar to the curve of the coast. The most conspicuous peak is mount Borie, in lat.  $18^{\circ} 10' N.$ , 8,956 feet in height, but being 35 miles from the coast, is from its great elevation often obscured. Seen from the northward, it presents a remarkable double summit. There are isolated peaks on the plains near the coast forming good landmarks for vessels in the offing.

**Vung Han bay**, is sheltered from easterly and southerly winds by Mui Duong cape, but is open to those from N.E. to West, and is therefore only available during the south-west monsoon period. Vessels can approach the low and sandy shore at his head according to draught. At the south-west corner of the bay is a large village backed by a conical peak. The country around is mountainous, and seems to be thinly inhabited.

**Kua Kau.**—To the westward, and separated from Vung Han bay by a point from 500 to 650 feet in height, is the Kua Kau, a small river with a bar, which dries at low water. Within is a large lagoon with a village at its head.

**Canal.**—In the Kua Kau is the entrance to the canal which skirts the shore of the gulf as far as the Song Ka river, but it is only navigable for native boats, being dry in certain places at times.

Var. 2° E.

Lat. 18° 9' N.  
Long. 106° 16' E.

**The Coast** from Vung Han trends north-westward, and is composed of sand occasionally interrupted by isolated mountains, the southernmost of which, named the Paps,\* is easily distinguished by its two peaks, 1,444 feet high. A third, but lower peak, lies a little south-east of the others, visible between the bearings of S.S.W. and West, whence the Annamite name of Rubado or Three peaks. The two high peaks are in line when bearing N. 79° W. A plain extends from the Paps to the foot of the mountains in the interior; it appears well cultivated and covered with hamlets. Further to the north-west, the coast hills increase in height and are cliffy to seaward as far as Ru Nuong a regular cone, 1,492 feet in height, which presents a bold cliff to seaward, and forms a conspicuous landmark for this neighbourhood.

There are no dangers beyond the 3-fathoms line, excepting the doubtful breaker referred to with Hon Nuong, below. At 2 to 4 miles from the shore are depths of 9 to 13 fathoms water over a bottom of mud and sand.

**Kua Nuong**, situated at the foot of the west extreme of Ru Nuong cliffs, has a very narrow entrance blocked by a bar with only a depth of one foot on it at low water. At one mile N. by W. from this entrance is a group of rocks from 16 to 20 feet high, and about half a mile in extent, with sunken rocks extending a short distance around them; these afford shelter to small craft during northerly winds in about 3 fathoms, with the eastern large rock bearing N. by E., about 3 cables, and mount Besson W.  $\frac{1}{2}$  N. A patch of 2 fathoms lies N.E. by E. about one mile from the east part of the entrance to the river.

Anchorage may be taken seaward of these dangers in a depth of 5 to 6 fathoms during the south-west monsoon.

On the coast, at 2 miles westward of the entrance, is mount Besson 361 feet in height, with a pagoda on its east side.

Lat. 18° 18' N.  
Long. 106° 9' E.

**Hon Nuong or North Watcher** is an islet 121 feet in height lying  $2\frac{1}{2}$  miles off Ru Nuong cliffs. It is precipitous and has depths of 8 to 11 fathoms around. To the eastward are some rocks, 26 feet high, a short distance south-east of which the sea has been seen to break. In the channel which separates Hon Nuong from the 5-fathoms line fronting the coast there are depths of 6 to 8 fathoms.

**Breakers** were reported in 1860, S.E. by S., distant about 2 miles from Hon Nuong; position approximate.

**Coast.—Mai Shott.**—North-westward of mount Besson, the coast is low and sandy, without hills and bare of vegetation, for a distance of 12 miles, to Ru Shott; this mount, 1,273 feet in height, is the summit of a ridge terminating 2 miles to the northward in Mai Shott, which

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General charts, 1,342 [2,689] and 2,062 [2,706].

is about 328 feet in height, cliffy, and only connected with the mainland by a very narrow isthmus. A rock dries 5 feet at a short distance north of it.

**Kua Shott** lies close westward of the high ridge of Ru Shott, between it and the sandy tongue which extends 2 miles south-westward of Kindoy hill, 722 feet in height; a sandy spit dries out from Kindoy village, reducing the entrance to 2 cables or less in width.

There is a depth of 6 feet on the bar at low water; inside the water is deeper, affording shelter for such craft as can pass the bar; the anchorage is narrow.

Between Kua Shott and Kua Hoi the depths decrease gradually towards the shore, and there are no known sunken dangers.

**Coast.—Nui Ong.**—To the north-west of Kua Shott is Nui Ong, 2,290 feet in height, the most prominent point on this coast, with four peaks of nearly equal height.

**HON MATT**, situated 19 miles northward of Kua Shott, and about 10 miles from the coast, is one mile in length, 679 feet in height, and precipitous on all sides except the south; it is a good landmark.

At a cable south of its south-east extreme is a rock awash at low water. Hon Truan, 144 feet in height, is the eastern and highest of the rocks situated 8 cables eastward of the south-east end of Hon Matt. A rock, with 6 feet water, and depths of 11 to 12 fathoms around, lies N.W.  $\frac{1}{4}$  N., distant  $1\frac{1}{2}$  miles from the summit of Hon Matt.

A small vessel could obtain shelter in the north-east monsoon under Hon Matt in 15 fathoms water.

**Islets.**—There are two islets or rocks, between Hon Matt and the mouth of the Kua Hoi; the southern rock, distant about 7 miles, S.W. of Hon Matt, is 39 feet high, with some detached rocks off its west end; the other, at  $1\frac{1}{2}$  miles N.N.W. of the southern rock, is low and flat. In the middle of the passage between them and Hon Matt the depth is from 8 to 10 fathoms.

**KUA HOI.—Depths.**—The Kua Hoi is considered next in importance only to the Song Ka or Red river of those that discharge into the gulf. It takes its rise in some of the mountains to the southward, but its upper part is so much encumbered with rocks as to be unnavigable. During high river the French gunboat *Estoc*, of  $4\frac{1}{2}$  feet draught, ascended a considerable distance.

The entrance points are both low and sandy; on the southern one is a pagoda, and on the other a small fort. There is a Custom-house about 2 miles above the fort.

Var. 2° E.  
Lat. 18° 45' N.  
Long. 105° 45' E.

The bar, which is a shifting one, subject to considerable alteration, extends a mile or more seaward of the southern point of the entrance, and may usually be crossed at high water by vessels under 10 feet draught. At exceptionally high tides, during high river, it may be available for vessels of 15 feet draught.

The channel into the river is subject to frequent and considerable changes; the buoys marking it are shifted, withdrawn, or added to as may be necessary in consequence of any alteration in the passage.

Vessels able to cross the bar can ascend to Bin Tui, 12 miles up, and the limit practically of navigation.

The mark for crossing the bar in 1887 was Nui Yen mountain, bearing N. 61° W. (between two little hills with some houses at the foot), and until nearly abreast the southern point; thence hauling into the river, and following the northern and western bank past the Custom-house if going to Bin Tui. Or, anchorage may be obtained inside the bar under the fort in 3 to 3½ fathoms, mud bottom; the tidal stream is very strong here at springs.

At 3 miles above the Custom-house is a creek with a pagoda on its south point, and fronted by a bank. Abreast, near the opposite shore, is a rock which dries half a foot; this is the only danger, and a vessel should keep mid-channel here.

There is anchorage off Bin Tui in about 3 fathoms, avoiding a position off the fort as there is a rock with one fathom water abreast it near the opposite shore.

**Bin Tui** is of some commercial importance; the mandarin road between Hué and Hanoi passes through it and across the river. It is one hour's walk from Vinh, the capital of the province of Nge An, and situated at the foot of the mountains; the hill over it is surmounted by a fort.

Lat. 18° 43' N.  
Long. 105° 45' E.

**Hon Nieu.—Anchorage.**—Hon Nieu, 486 feet in height, at 2½ miles northward of the Kua Hoi entrance, consists of two hills separated by a neck of low land, so that from a distance, when bearing south, it will appear like two islands. There is good anchorage close under its west end in 5 fathoms, with shelter from north-east winds, much frequented by junks and vessels that cannot enter the Kua Hoi. In the passage between the island and coast there is a depth of 3 to 5 fathoms.

**Rocks.**—A rock, which covers at high water springs, lies about 1½ miles N.N.E. from the north-eastern point of Hon Nieu; breakers also were observed by the *Comete* between this rock and Hon Nieu, about N. by E., distant 7 cables from the north-eastern point of the island.

A cluster of rocks, awash at half tide, lies about  $2\frac{1}{2}$  miles N. by W. of Hon Nieu, and E.  $\frac{3}{4}$  S., distant 3 miles from cape St. Anne. Chart, 875 [2,707]. Var.  $2^{\circ}$  E.

Vessels proceeding to Hon Nieu anchorage should pass southward of the island.

**Tides.**—See page 467.

**Coast.**—**Cape St. Anne** is cliffy and situated 5 miles northward of the Kua Hoi. The sandy plain through which the Kua Hoi flows is terminated by a mountain chain of which Nui Yen, 1,414 feet in height, is the summit, situated about  $2\frac{1}{2}$  miles from the coast north of cape St. Anne. Lat.  $18^{\circ} 51' N.$ , Long.  $105^{\circ} 51' E.$

**Kua Lo** discharges at one mile southward of cape St. Anne, and is only practicable for small boats. It connects with the Kua Hoi at Bin Tui by a canal or creek leading past Vinh, the capital of the province, previously referred to.

**Rocks.**—The north point of the entrance is foul to the distance of nearly a mile, with one or more rocks dry at low water: the south point is foul to about a quarter of a mile. At half a mile southward of the south point is a remarkable high black rock attached to the shore, named Kau Lo rock.

From cape St. Anne the coast is cliffy and backed by hills for a distance of 5 miles, to Brandon bay, where it is again low.

**Brandon bay**, northward of cape St. Anne, is about 15 miles wide with depths decreasing gradually towards the shore; the 3-fathoms edge of the bank fronting its head is 2 miles off. The bay affords but little shelter as it is open to the north-east, and during the south-west monsoon the wind blows in at S.E.

The Kua Vann discharges near the centre of the bay, but it is only available for boats. A considerable number of fishing boats may be seen entering or leaving towards high water, and they will be met with from 10 to 15 miles off shore during the fine season.

The mountains are distant from the head of the bay, and there are no landmarks near the coast other than an isolated peak of regular form, named the Pâtè.

**A sunken rock** lies nearly a mile off shore at about 2 miles south-west of Lakh Kuen entrance, and the shore between is bordered by rocks.

**Lakh Kuen or Mahn son river** discharges into the north end of Brandon bay near cape Falaisè; it is about two cables wide in the entrance, but Dog rock, situated nearly a cable from the western shore, with which it is connected by a bank, reduces the breadth to

Chart. 875 [2,707]. one cable. There is a depth of  $4\frac{1}{2}$  feet on the bar at low water, Var.  $2^{\circ}$  E. which extends about a quarter of a mile seaward of the point, and being somewhat protected from the north-east monsoon by the formation of the coast, is often practicable when the bars of other rivers are not.

An artificial barrier extends, from a little to the north of Dog rock, towards the opposite point, of the river, narrowing the channel to about 45 yards.

The anchorage within, abreast Mahn son, is sheltered, and has about one fathom least water; the depths increase about half a mile up.

**Cape Falaisè**, the north extreme of Brandon bay, is a cliffy point 561 feet in height, with a white stripe on its northern face.

At 4 miles northward of the cape are two conspicuous rocks close to the shore, or about midway in the bay lying between cape Falaisè and Kua Trapp.

Lat.  $18^{\circ} 13\frac{1}{4}'$  N.  
Long.  $105^{\circ} 45'$  E.

**Kua Trapp**, close westward of cape Buton,\* has a large estuary, at the head of which is a village surrounded by trees. At low water the estuary almost dries, but there is a channel on the east side used by fishing boats.

**COAST.**—North of Kua Trapp the coast is bordered by a chain of hills attaining a height of 1,430 feet in Nui Tiep, under which is Bien Shon and the Hou Mé group.

**Bien Shon island**, separated from the coast by a channel 3 cables wide, is 2 miles in length north and south, by half a mile in breadth and 557 feet in height. Westward of its north extreme is a bay, which affords anchorage for small craft, under 11 feet draught, sheltered from all but north-west winds. The principal village on the island is situated on the north-west side, and affords supplies of fresh provisions and water.

Lat.  $18^{\circ} 20'$  N.  
Long.  $105^{\circ} 47\frac{1}{4}'$  E.

**LIGHT**—From a white house, situated on a hill on the eastern side of Bien Shon bay, a *fixed white* light is exhibited at an elevation of 82 feet above high water, and 16 feet above the ground, visible at the distance of 9 miles in clear weather, when bearing from N.  $2^{\circ}$  W., through west and south, to East.

**Shoals.**—There is a patch of 2 fathoms distant 4 cables from the east side of Bien Shon and one mile from its north point.

Extending some distance from the south point of the island is a bank, which breaks, and one-third of a mile southward of the same point is a rock, dry at low water.

**Hien Hoa.**—On the coast opposite Bien Shon is the mouth of the Hien Hoa, which dries.

**Inner channel.**—The channel between Bien Shon and the coast var.  $2^{\circ}$  E. is reduced to less than half a cable in width in places by the bank extending from the mangroves on the mainland. This channel affords shelter for junks and other craft of light draught (from 8 to 13 feet according to whether it is springs or neaps) entering from the northward. There is a bay with 6 feet water over it, about 4 cables south of the west point of the northern bay, off which point is a rock which dries 5 feet. Junk point, nearly under the summit of the island, in line with Finger point, on the south-west side of the island, bearing S.  $17^{\circ}$  E., leads in over the bar, having approached this leading mark from the north-eastward with the summit of Hon Mé open of the north point of Bien Shon. Junk point is steep-to. Here small craft may anchor or proceed farther south to abreast the village.

The southern entrance appears to be impracticable.

**Hon Mé**, distant 7 miles from the coast, is the most northern of a group of islets, nearly all precipitous. It is 770 feet high and wooded, with a fairly good anchorage on its south-west side, in a depth of 4 to  $4\frac{1}{2}$  fathoms, between Hon Vat and Hon Vong. The westernmost island, which is flat and precipitous, named Hon Bong, has rocks extending 4 cables to the westward of it. A ridge with less than 5 fathoms extends about 7 cables south-west of Hon Gok, situated 3 cables south-east of Hon Bong, and about one mile north-west of Hon Dot; the latter is the highest of these smaller islets and is cone-shaped.

Nui Kong peak in line with cape Bang, bearing N.  $20^{\circ}$  W., leads between Bien Shon and the group, clear of danger.

**The Coast** from abreast Bien Shon island trends north 6 miles to Kua Bang, is composed of sand, and fronted by a bank to the distance of a mile or more. The north point of the entrance, cape Bang, 295 feet in height, has a peak in the shape of a finger.

**Kua Bang** has a very narrow entrance and is only accessible to boats. Within are several villages, the most important of which is Lang Diann, a Christian village; the tower of the church is visible over the trees in the offing.

Northward of cape Bang is a sandy plain which continues as far as cape Kiao. At 3 miles north of cape Bang, within the 3-fathoms line, are two rocky heads; the outer, at half a mile off shore, dries 4 feet.

**Aspect.**—A range of hills backs the coast, the southern peak of which is Nui Tu vi, 1,854 feet in height and cone-shaped; Nui Diaz 1,696 feet,\* is the northern highest peak; these two serve to identify the neighbourhood. At Nui Diaz the range turns abruptly to the west; here

Lat.  $19^{\circ} 22' N.$   
Long.  $103^{\circ} 54' E.$

Var. 2° E.

the plain of Than Hoa commences, through which run two rivers, the Lakh Yapp and the Song Ma, besides numerous canals.

**Lakh Yapp or Kua Mom** has a depth of 4 feet on its bar at low water springs ; vessels of less than 10 feet draught can usually enter at high water, but the bar breaks on both sides of the passage. There is good anchorage within for such craft as can cross the bar. The river turns sharply northward within the bar for about 2 miles, to the foot of Nui Voh hill, which is 426 feet in height and a good landmark, the land all around being low and sandy.

The villages of Ko Kheann and Ko Nian are situated on either side within the entrance.

Lat. 19° 43' N.  
Long. 106° 52' E.

**Cape Kiao or Nui Gam** is somewhat conspicuous, being about 150 feet in height, and with a pagoda on its north side visible from the offing. There is a sandy bight close under it on either side, affording good landing at high water according to the prevailing monsoon.

**Lakh Kiao or Song Ma** is next in importance to the Kua Hoi of those southward of the delta of the Song Ka. It has two entrances, separated by a bank which breaks at low water. The deepest channel has over the bar, which is subject to change, a depth of about 5 feet at low water. About 8 miles above the entrance is the town of Than Hoa, which is the chief town of the province, the most important between Hué and Hanoi.

The only conspicuous hill is La Dent, some 15 miles inland, which rises from the plain around. The plain near the coast is cultivated and wooded, with numerous villages scattered about it.

**Beacon and buoys.**—On the north entrance point there is an iron pyramidal beacon, about 30 feet high, painted red.

In the entrance approach is a black buoy with cylindrical topmark. The bar is subject to change, and any buoys moored on it are moved as required to mark the channel.

Lat. 19° 53' N.  
Long. 105° 55' E.

**Lakh Tran.**—At about 6 miles northward of Lakh Kiao is a remarkably steep and isolated hill, 689 feet in height, forming the south side of the entrance to Lakh Tran. The river communicates with the Kiao in the interior, and is accessible by vessels under 11 feet draught at high water. The entrance is between the high south point and the islet 88 feet in height, at one cable off it. There is only a boat passage north of the islet.

The points on either side of the entrance are foul to the distance of 50 yards ; a rock on the left bank is marked by a red buoy. In the fairway there is a depth of 5 feet at low water, and the course in is N. by W. & W.,

with the summit of an isolated cone hill, 360 feet high, kept midway between the points. When abreast the points haul to W.N.W., and gradually W.S.W. to the anchorage off the village on the south shore, in Lat.  $19^{\circ} 53' N.$  Long.  $105^{\circ} 55' E.$  Chart 1,965 [2,706]. Var.  $2^{\circ} E.$

9 to 10 feet. There is a rock nearly dry at low water at about 50 yards south of the south point of the anchorage.

This river can be easily entered during the north-east monsoon period, which gives it an advantage over other rivers of greater depth, which are often then not practicable.

The village of Truong Xo is on the north shore.

**Outer anchorage.**—There is an islet, 19 feet high, about one mile eastward of the entrance to the river, southward of which there is anchorage in a depth of about 4 fathoms.

**Tides.**—On the coast between Hon Tseu and Hon Né the tides present the same characteristics as those further north, except that the range is about one foot less. The heights and times of the tides are nearly the same along this coast, being from 3h. to 3h. 30m. at full and change, with a rise of about 9 feet, or from  $1\frac{1}{2}$  to 2 hours in advance of Do Son (page 473); at neaps the tides are 3 hours earlier than at Do Son.

**Winds.**—Between lat.  $18^{\circ}$  and  $20^{\circ} N.$  the north-east monsoon is not so strong as further south, and there are often periods of calm. In general the atmosphere is misty, and the mountains inland are hidden during this monsoon. The south-west monsoon blows along the coast from S.E. or S.S.E.; it is not very fresh as a rule, and does not cause any sea on the bars of the rivers. The mornings are calm, the wind freshens about noon, and continues so until about 4 p.m.; it dies away towards sunset.

**Hon Né**, 282-feet high, lying about 3 miles north-east of the entrance to Lakh Tran, affords a temporary shelter from northerly winds in about 6 fathoms water.

**BACHT LONG VI.**, White-tailed Dragon or Nightingale island, is situated near the middle of Tong Kiug gulf, and from its position is a good landmark for vessels bound to the head of the gulf. It is about  $1\frac{1}{2}$  miles in length, triangular in shape, and 190 feet in height; its summit is a plateau and its sides are precipitous in places, with trees in other parts on the slopes. The island is surrounded by sunken rocks extending out from a half to three-quarters of a mile, with depths of from 7 to 10 fathoms beyond; it is advisable to give it a berth of about 2 miles. Shoals of fish are very plentiful in the neighbourhood, and have been taken for sandbanks when seen from some distance.

Charts, 1,965  
[2,706], 1,169  
[2,711].  
Var. 14° E.

**NORWAY ISLANDS or SUI NONG TAO** are situated about 18 miles eastward of the entrance to the Do Son, and about 6 miles from the archipelago of the Kak Ba; they consist of two groups, the easternmost of which is visible from a distance of 20 miles in clear weather, and is a natural landfall for vessels going to Haifong, &c. The islands are high, inaccessible, and free from danger on the south. The largest island has a creek on its eastern side which affords shelter to small craft.

At  $1\frac{1}{2}$  cables westward of the north-westernmost island there is a rock with a depth of 4 feet over it at low water, situated  $1\frac{7}{10}$  miles N.  $87^{\circ}$  W. from the lighthouse.

Lat.  $20^{\circ} 37\frac{1}{4}'$  N.  
Long.  $107^{\circ} 8\frac{1}{4}'$  E.

**LIGHT.**—From a grey circular tower, 98 feet in height, erected on the eastern side of the largest of the Norway islands, is exhibited at an elevation of 361 feet above high water, a *flashing white* light showing a flash *every minute*, and visible in clear weather from a distance of 22 miles. This light is sometimes obscured by mist, owing to its elevation, when the weather appears clear from an approaching vessel. It is also occasionally obscured on certain bearings by the other islands of the group.

**DELTA OF THE TONG KING.**—About 7 miles northward of Hon Né (lat.  $19^{\circ} 55'$  N.) is the south extreme of a chain of serrated mountains, north-eastward of which the country for a considerable distance inland is entirely flat, forming the delta and the valley of the Song Ka; nothing is to be seen from the offing but a low shore, relieved at a distance by trees which here and there appear to rise out of the sea.

The mouths of the several branches of the Song Ka and the Thai Binh form a great delta between the parallels of lat.  $20^{\circ}$  N. and  $20^{\circ} 50'$  N.; and the several branches communicate with each other, partly by natural means and partly by canals constructed by the inhabitants.

Fronting the several mouths are extensive shallow banks; the 5-fathoms line in 1897, off the Ba Lakh Dong, being as much as 15 miles south-eastward of the entrance points. On approaching the delta the lead should be constantly used and none of the mouths should be attempted without a pilot.

**THE SONG KA or RED RIVER**, which has its source in the centre of the table land of Yunnan, flows through Hanoi and waters the whole of the valley of Tong King. Its principal tributaries are: on the right bank, the Black river, which also comes from Yunnan and joins the Song Ka near Hung Hao; on the left, the Bo De or Clear river, which comes from the south-east corner of Yunnan and empties itself into the Song Ka above Song tai. Some miles above Hanoi, the main river separates, forming two branches, the southern being named Dai; the northern branch is again divided into several others, of which the principal are the Kua Lakh, the Kua Ha lan, the Kua Ba Lakh Dong, and the

General chart, 2,062 [2,706].

Kua Tra li. The Song Ka is also joined to the Dai by several canals, two of the principal being the Fu li and the Nam Dinh.

Chart. 1,963  
[2,706].  
Var. 14° E.

Steamers of very light draught run on the Song Ka as far as Laokai, near the Yunnan frontier, and a considerable transit trade is developing. See also communication on pages 470, 475.

**Navigable Depths.**—Vessels of about 9 feet draught can navigate to Hanoi by the Dai mouth, which has a depth of 10 feet on its bar at high water springs; at low water they cannot get beyond the Fu li canal. The Tra li mouth is more accessible, but at some distance up it is also barred, there being only water enough for boats. The other mouths are considered impracticable.

From December to May the Song Ka is at its lowest. About May the melting of the snows in Upper Tong King and Yunnan causes the river to rise rapidly, frequently washing away the banks. The rise at Hanoi at high river is from 16 to 20 feet.

**MOUTHS OF THE SONG KA.—Kua Dai route to Hanoi.**—The Kua Dai is fronted by sandbanks which dry in places from one to 3 feet to the distance of  $7\frac{1}{2}$  miles southward of the entrance, or to about the parallel of Hon Né. There is a narrow gutter through these banks, just dry in places at low-water springs, which will give a depth of about 10 feet at high water springs.

Lat. 19° 55' N.  
Long. 106° 44' E.

Immediately within the river there is deep water, and it is possible with the aid of a pilot to reach Hanoi, either by the Fu li canal, or that of Nam Dinh, at high water.

**Tides.**—The time and rise of tide is about the same as at Do Son, see page 473. The tides are felt some miles above Hanoi.

**Buoyage.**—A black spindle buoy with cylindrical top-mark, moored in 13 feet water, marks the outer western point of the bar entrance at about  $7\frac{1}{2}$  miles S.  $\frac{3}{4}$  W. of the mouth of the river, with Hon Né bearing W.  $\frac{3}{4}$  S. about 5 miles. The channel over the bar is marked by 6 red barrel buoys (indistinctly seen); the channel leading from the bar to the river is marked by five red sphero-conical buoys with conical top-marks. The bar is gradually extending seawards, and the passage over it is subject to frequent changes; the buoys are shifted as necessary.

Hon Né is a good mark when approaching the bar.

North-eastward of the mouth of the Dai and 5 miles off shore, the *Duchaffaut*, 1878, touched on a bank of soft mud, dry at low water, reported to be situated as noted in the margin. Immediately before touching the bank a depth of  $9\frac{1}{2}$  fathoms was obtained.

**Kua Lakh and Kua Ba Lakh Dong.**—These two mouths are considered to be impracticable for vessels; shallow banks, which break,

Chart, 1,963  
[2,706].  
Lat. 20° 28' N.  
Long. 106° 37' E.  
Var. 14° E.

extend many miles to seaward, the 5-fathoms line being 15 miles off shore, as before stated.

**Kua tra li** is considered as the easiest of access of the mouths of the Song Ka ; but unfortunately in proceeding towards the main branch of the Song Ka, it becomes so shoal that even junks are obliged to stop and transport their cargoes in sampans. An active trade in salt and rice is carried on ; but pirates make frequent raids.

**Kua Dien ho**, situated 5 miles northward of the Tra li, is considered impracticable.

Lat. 21° 2' N.  
Long. 105° 50' E.

**HANOI**, the capital of Tong King and the seat of government of Indo-China, is situated on the Song Ka at about 100 miles from its mouth. The fortified towns of Nam Dinh and Hung Yen are situated 30 and 50 miles respectively from the entrances.

The city of Hanoi is built close to the river, which here is one-third of a mile in width, and owing to the lakes and trees interspersed, presents a rather picturesque appearance. The citadel occupies the highest site, and is surrounded by a brick wall 12 feet high and a moat. It contains the barracks, arsenals, magazines, &c., and the Royal Pagoda stands within its enclosure. The ancient city is situated between the citadel and the river.

Since the occupation by the French in 1882, great improvements have been effected in the laying out of the town and the formation of roads and streets. Long wide streets have been constructed and lighted by electricity. The cathedral, with three towers, is a conspicuous object. The Petit Lac is a sheet of water in the middle of the new city, near which are the town hall, treasury, post office, &c. Of the temples, that of the Grand Bhudda on the shore of the Grand Lac, is, perhaps, the most important.

The residence of the Governor-General and Commander of the troops, the Government offices, hospital, &c., are situated on what was formerly the Concession, near to the river bank.

**Population.**—The population of Hanoi is about 107,000, of whom 1,350 are Europeans (exclusive of the military), 100,000 Annamites, 4,000 Chinese, 106 Thoe Kien, 1,500 Cantonese, 50 Japanese, and 50 Indians.

**Communication.—Telegraph.—Railway.**—Hanoi is connected with Haifong by telegraph, which place is connected by submarine cable with Hong Kong, &c. Mails are bi-monthly, *via* Haifong by the inland waterways or natural canals. Cargo destined for Hanoi comes from Haifong chiefly by the same route.

Railways run from Hanoi, *via* Langson to the frontier of China (Kwang Si) ; from Hanoi to Haifong ; from Hanoi to Ninh Binh, hence under construction to Hué *via* Vinh ; and from Hanoi to Vietri, whence one is under construction to Laokai.

**THE THAI BINH** rises in the mountains to the south-west of the Chinese province of Kwang Si. In the province of Hai Dzung it divides into numerous branches, of which the most important are : the Kua Thai Binh, the Kua Van Uk, the Kua Trai, the Kua Kam, the Kua Nam Trieu and the Lakh Huen. It is also joined to the Song Ka by several canals; the two most important being the Kua Lok and the Song Chi or Bak Ninh. The tides are felt throughout its whole length, and contrary to what happens in the Song Ka, the yearly rise of the river is small.

The different arms of the Song Ka, of the Thai Binh, and the canals which join them encompass a vast tract of low marshy country of great fertility. All the trade of this district passes through Haifong, at the confluence of the Kua Kam and the Song Tam Bak, the other branches of the delta being only frequented by coasters.

Between Kua Dai and the peninsula of Do Son, banks, which often shift, extend 6 to 8 miles to seaward.

**Mouths of the Thai Binh.—Kua Thai Binh.**—The Thai Binh is navigable for vessels of 13 to 14 feet draught. Its principal mouth, named Kua Thai Binh, is encumbered with banks and divided into two channels. The eastern channel has 5 feet on the bar at low water, but the want of natural leading marks renders access dangerous. Upon the bar of the western channel there is only 2½ feet at low water; springs rise about 10 feet. (*See tides, page 473.*)

**Kua Van Uk.—Channel to Hai Dzung.**—The Kua Van Uk has about 7 feet on the bar at low water, and deep water within. The marks for crossing the bar from the latest information are the peak 394 feet in height (about 8 miles inland) just open eastward of Conical hill, bearing N. 26° W. The Gua canal, by which the Kua Van Uk is joined to the Thai Binh, makes this river the shortest route to Hai Dzung.

The four other branches of the Thai Binh debouch in the large estuary comprised between Do Son peninsula and the island Nui Kak Ba.

Hai Dzung, 21 miles west of Haifong, the chief town of the province of that name, is one of the largest in Annam, and possesses a citadel.

Between the Delta and Hai Dzung there is usually a current running out of the river at the rate of a half to one knot. Above Hai Dzung, in the narrow portion of the channel leading to Bak Ninh, the current runs from 1½ to 2 knots an hour.

**Kua Trai.**—The Kua Trai flows into the channel of the Kua Kam, and has a bar with depth of about 3 feet on it at low water. When the

Charts, 1,963  
[2,708].  
775 [2,709].  
Var. 13° E.

Lat. 20° 43 $\frac{1}{4}$  N.  
Long. 106° 47 $\frac{1}{4}$  E.

Song Chi canal is impracticable, this route is the shortest between Haifong and the Song Ka river.

**KUA KAM.**—**Channel to Haifong.**—The Kua Kam is the only practicable mouth for vessels of moderate draught, and is the chief river of commerce in Tong King. It has two bars; the outer has a depth of 8 feet on it at low water, and the inner 5 feet at low water, with 18 and 15 feet respectively over them at high water ordinary springs.

Vessels drawing 16 feet can cross the bar at high water ordinary springs, and those of 12 feet draught at high water neaps, but the range of tide is uncertain. Above the bars the water is deeper, to Haifong and beyond, and the river is navigable as far as its junction with the Thai Binh, 30 miles above Haifong and 46 miles from the sea, for vessels of 10 feet draught.

The outer bar is composed of rather hard muddy sand; the inner of soft mud, upon which vessels can ground without damage. The two bars are separated by a pool just within Do Son point, about a mile in length, with a depth of 10 $\frac{1}{2}$  feet at low water, constituting a safe anchorage for small vessels sheltered by the neighbouring banks; it is known as the anchorage of the Fisheries.

The Kua Kam lies close eastward of Do Son peninsula, which attains a height of 430 feet, its extreme being 246 feet in height. These hills are the first objects seen when approaching the river.

Hon Dau lies about half a mile off it, with a rock which covers and uncovers in the channel between. The 3-fathoms line fronting the entrance extends from about the extreme of the peninsula to the south end of Nui Kak Ba.

A canal cut through Dinh Vu island connects the Kua Kam with the Kua nam Trieu. (See lights, pages 473, 478.)

Lat. 20° 40' N.  
Long. 106° 48' E.

**LIGHTS.**—On Hon Dau island, from a grey octagonal tower, 65 feet in height, is exhibited at an elevation of 203 feet above high water, a *fixed white* light, visible between the bearings of N. 48° E., through north and west, to S. 42° E., which in clear weather should be seen from a distance of 20 miles.

It is intended to establish tide signals near the lighthouse.

From a beacon (A) situated N. 19° W., distant 1 $\frac{1}{10}$  miles from Do Son point, is exhibited a *fixed white* light, visible when bearing from N. 61° W., through north and east, to S. 1° E.

Lat. 20° 46 $\frac{1}{4}$  N.  
Long. 106° 46 $\frac{1}{4}$  E.

From a red pile structure (B), surmounted by a pole to the total height of 56 feet, situated N. 15° W., distant 3 $\frac{3}{10}$  miles from Do Son point, is exhibited a *fixed white* light, elevated 30 feet above high water, visible from the bearing of N. 48° W., through north and east, to S. 12° W.

A *fixed red* light is shown from a beacon (C) situated  $3\frac{1}{2}$  miles N.  $36^{\circ}$  W. Charts. 1,965 [2,708].  
of the preceding, visible when bearing from N.  $1^{\circ}$  W., through west and Var.  $1\frac{1}{4}^{\circ}$  E.  
south, to S.  $61^{\circ}$  E.

A *fixed white* light, elevated 32 feet above high water and visible from the bearing S.  $45^{\circ}$  E., through east and north, to N.  $85^{\circ}$  W., is shown from a pile structure, 44 feet high, painted red, erected on Dinh Vu island on the north side of the western entrance to the canal connecting the Kua Kam with the Kua nam Trieu.

A *fixed red* light is exhibited on the south side of the entrance,  $1\frac{1}{8}$  cables from the preceding light; it is shown from a black iron support at an elevation of 23 feet above high water, and is visible when bearing from East, through south, to N.  $50^{\circ}$  W.

A *fixed white* light elevated 28 feet above high water is shown from a beacon 47 feet in height, situated on the west side of the western entrance to Vang Chau, bearing N.  $42^{\circ}$  E., distant  $1\frac{1}{2}$  miles from the observatory at Haifong. It is visible when bearing from N.  $71^{\circ}$  E., through north and west, to S.  $11^{\circ}$  W. Lat.  $20^{\circ} 52\frac{1}{4}'$  N.  
Long.  $106^{\circ} 41\frac{1}{4}'$  E.

**Pilots.**—The pilots cruise between the Norway islands, Kak Ba, and the outer red buoy on the bar of the Kua Kam. They fly the French flag, and have a black anchor, their number, and the letter H painted on their sails. When waiting for the tide, vessels should anchor, in fine weather, about 3 miles E. by N. of Hon Dau, in a depth of  $4\frac{1}{2}$  fathoms.

If there is a heavy swell, it is better to go to the anchorage of Kak Ba, which is accessible to vessels under 19 feet draught.

**Buoys.**—The Kua Kam channel between Do Son point and Haifong is marked by buoys and beacons; the starboard side, on entering, by red buoys and beacons, the port side by black buoys and beacons.

The outer buoys are liable to be displaced by the sea.

**Landmarks.**—The principal landmarks coming from the southward are Hon Dau with its lighthouse; the Mirador hills on the Do Son peninsula,\* which will be seen before the island; Nui Voi or Elephant mount, 525 feet in height, situated 17 miles north-westward of Do Son; the summit of the Pagoda range; a conical hill 853 feet in height, 12 miles N.N.W. of the Elephant; and the Nui Deo, 476 feet high, north-east of the Elephant. The Meteorological Observatory at Fu-Lien also forms an excellent mark; it appears as a tower on a very clearly-defined hill.† Lat.  $20^{\circ} 48\frac{1}{4}'$  N.  
Long.  $106^{\circ} 46\frac{1}{4}'$  E.

**Tides.**—In the approaches to Haifong (Do Son) and also in the approaches to Hanoi, the tides are subject to a large diurnal inequality, only one high and one low water generally occurring in the 24 hours.

The highest tides are found about three days after the moon has attained her greatest north or south declination, and the tides are least

Charts, 1.965  
[2,708].  
775, [2,709].  
Var. 14° E.

about three days after the moon has crossed the equator, at which period the ordinary two complete tides in the day are generally observed.

It is high water about five hours after the moon's superior transit when the moon has north declination, and about five hours after the inferior transit when she has south declination. The tides are higher in the north-east than in the south-west monsoon.

At Do Son peninsula it is high water, full and change, at about 5 hours p.m. in June, and 5 hours a.m. in December. The maximum rise that has been observed is  $12\frac{1}{2}$  feet; ordinary rise about  $10\frac{1}{2}$  feet; when the tides are very weak the water often remains all day at about mean water level with irregular oscillations. The tide at Haifong is about an hour later.

The flood steam runs to the northward, and the ebb to the southward in the offing.

The difference in time and height of the tide at Do Son, the Norway islands, and other ports in this neighbourhood, is but little.

**Directions.**—The landmarks have been previously mentioned. Coming from the southward, especially in hazy weather or at night, the lead should be carefully attended to on account of the shallow water off the delta. From the eastward, Bacht Long vi and the Norway islands are good marks.

The bank of soundings of about 15 fathoms, between the parallels of lat.  $20^{\circ} 15'$  and  $20^{\circ} 26'$  N., and the meridians of long.  $106^{\circ} 45'$  and  $107^{\circ} 12'$  E., is said to be a good guide; as approaching Hon Dan when bearing about N.N.W. the bottom is sand and mud, whilst to the westward nearer the delta, it is nearly all mud, with broken shells in places; and eastward of the line it is chiefly sand with black speckles. Northward of this area the bottom is mud or sand and mud. The 10-fathoms line off Hon Dau is 7 miles distant, and appears to be permanent.

If a pilot has not been picked up in the offing, a vessel should approach Hon Dau lighthouse on about a N.W. bearing, anchoring to the eastward of it if necessary, as mentioned under the heading of Pilots, page 473, until one has been obtained.

**Entering the river.**—Vessels of 12 to 16 feet draught can enter in charge of a pilot as before stated. The following remarks may, however, prove useful. The outer bar is crossed with the summit of the Pagoda range in line with the first trees on the east point of Kua Trai,\* bearing N.  $48^{\circ}$  W., which mark leads to the Fisheries anchorage (between the outer and inner bars) between Do Son point and the first red buoy, and close southward of the first beacon light (A).

\*Lat.  $20^{\circ} 47\frac{1}{4}'$  N.  
Long.  $106^{\circ} 43\frac{1}{4}'$  E.

From abreast the beacon steer across the inner bar, eastward of the black buoy, with Little Mirador hill in line with the kiosk on Du Son point bearing S.  $12^{\circ}$  E. astern, until abreast No. 2 beacon light (B), distant about two-thirds of a cable; then some remarkable hummocks to the eastward of Nui Deo will be seen in line with Black point (the point on the west side of the river 3 miles below Haifong), which mark being steered for will lead in the direction of No. 3 beacon light (C), which should be passed at the distance of about half a cable. Here the channel bends sharply to North in the direction of the entrance to Dinh Vu canal (see light, page 473) abreast Black point, above which to Haifong there is no difficulty.

**Anchorage.**—The river at Haifong is  $2\frac{1}{2}$  cables wide, with depths of 4 to 6 fathoms; a number of vessels could be berthed there.

Vessels can anchor either above or below the mouth of the Song Tam Bak, the former seems preferable; it is advisable to moor.

**A mooring buoy** for the use of the steamers of the Messageries Maritimes Company is placed in the anchorage above Haifong.

**HAIFONG** on the Kua Kam, about 16 miles above the entrance, is the shipping port for Hanoi, Hai Dzung, and Nam dinh, the commercial centres of Tong King. It is connected by canals or creeks with the Thai Binh and Song Ka. The banks of the river are low and consist of alluvial mud from which the present town has been reclaimed. Haifong is situated on both sides of the Song Tam Bak which connects with the Thai Binh. The native part of the town consists of wretchedly built huts of bamboo, but the European part has broad boulevards lighted by electricity. The Hotel de Commerce is a large and conspicuous building fronting the creek and river; there are large barracks, and a fine hospital at Luang yen. There are fine wharves and a small dock.

In the distance are rugged limestone hills and beyond these to the northward, some 18 miles, is a range of mountains culminating in the Grand Summit, 3,609 feet in height.

It is intended to make a deep water port of Haifong, with a channel leading to it from Ha Long bay at the head of Henriette pass, through the Grande Bréche and Ha Nam island to Kua Nam Trieu.

**Population.**—The population of Haifong in 1897 was 18,480, of whom 900 were Europeans, 5,500 Chinese, 12,000 Annamites, &c.

**Communication.**—The following steamship lines call at Haifong. The Messageries Maritime run weekly, with a cargo boat once a month, and four other French steamship companies call once a month. Steam vessels ply between all the navigable ports of Tong King, and a company

Charts, 1,965  
[2,708].  
775 [2,709].  
Var.  $11^{\circ}$  E.

Charts, 1,965  
[2,708].  
775 [2,709].  
Var. 1<sup>o</sup> E.

runs vessels between Haifong and Hong Kong. A bi-monthly postal service is run between Haifong and Kuang-tcheou, calling at Pakhoi and Hoi hau. A branch steamer of the Messageries Maritime which conducts the service between Saigon and Hong Kong calls here bi-monthly.

A regular river service of steamers is maintained between Haifong and Hanoi. The steamers use the Kua Lok canal during the dry season and the Song-chi in the wet. The latter canal flows into the Song Ka, a little above Hanoi, and is much the shorter route; unfortunately, it is shoal and interrupted by rapids, where the current is very strong. Cargo destined for Hanoi goes the same way. Hanoi (and therefore Haifong) has steam communication along the Song Ka or Red river to Laokai, the nearest frontier town to Mengtsz.

Lat. 20° 52' N.  
Long. 106° 40' E.

**Railway.**—Haifong is connected by railway with Hanoi. A railway connects Fulang-thuong with Langson on the road to Langchau. It is proposed to extend it to Nacham, on the Chinese frontier. These facilities have diverted a considerable portion of the trade which formerly went through Pakhoi.

**Telegraph.**—Haifong is connected by submarine cable with Hué, and Saigon, &c. Office always open.

**Products.**—The exportation of rice is the most important article of commerce; other exports are silk, gambier, mother-of-pearl, &c.

**Supplies** can be easily obtained. Water for drinking purposes is good; it is brought to the town by an aqueduct from the source of the Song Huong situated in the mountains of Dong Trieu, 19 miles distant.

**Repairs.**—Vessels over 300 tons capacity are built here, and repairs to vessels and machinery can be effected. A steam crane is available for lifting a weight of 50 tons.

There is a patent slip at Haifong suitable for small vessels of 100 tons.

**Coal.**—There is generally a considerable stock of coal kept here.

**Storm signals.**—Storm signals are shown from a flagstaff upon the old tower of the semaphore station at Haifong, by the International Code of Signals, except the three following special signals, namely:—

1. A red ball above a compass signal signifies a typhoon signalled from Hong Kong travelling in the direction indicated; the typhoon is more than 300 miles from Hong Kong.
2. A black ball above a compass signal signifies the typhoon is travelling as indicated, and that it is less than 300 miles from Haifong.
3. The B flag of the International Code above a black ball signifies—Order to the vessels moored to the wharves to haul off.

**Dinh Vu canal.**—The Dinh Vu canal is an artificial channel cut through the centre of Dinh Vu island, and connecting the Kua Kam with the Kua Nam Trieu. It is nearly a mile in length, 131 feet in width at high water, and has a depth of 19½ feet at low water.

Charts, 1,965  
[2,708].

Lat. 20° 51' N.  
Long. 106° 54' E.  
Var. 1½° E.

The navigation of the canal is restricted to steam-vessels, and for them between sunrise and sunset only.

Every steam-vessel desiring to pass through the canal must conform to the following rules:—

1. A vessel approaching either entrance of the canal with the view of passing through it, is required to sound her steam-whistle frequently, and to hoist flag R of the International Code (red with yellow cross) at the foremast head, as warning to the dredgers.

The dredgers display a red flag at half mast when at work; this flag is hoisted to the mast head when the channel is clear. Vessels entering lower flag R to half mast, keeping it in that position until clear of the other end of the canal.

Vessels are not permitted to enter the canal unless the weather is sufficiently clear to enable them to see its further end, and to be assured that no other vessel has entered from the opposite direction.

2. When two steamers arrive at the same time from opposite directions for the canal, the one arriving by the Kua Nam Trieu must wait until the steamer coming from the Kua Kam has passed through, and must anchor if necessary.

3. Vessels in the canal are to proceed at the lowest possible speed.

Four mooring posts for securing vessels to are in position on each side of the canal; a pathway runs along both sides.

**NOTE.**—If possible, the Captain of the port of Haifong should be informed beforehand by the agents of the vessel, as to the date and time of their expected arrival, so that necessary instructions may be given to those engaged in dredging and to the pilots.

**Lights.**—See pages 473, 478.

**KUA NAM TRIEU.—LIGHTS.**—The following lights are exhibited in the Kua Nam Trieu:—

Lat. 20° 48' N.  
Long. 106° 50½ E.

South-eastward of Dinh Vu island, on the sand bank extending therefrom, at the distance of 3½ and 2½ miles, respectively, two *fixed* lights to lead over the bar, each visible at the distance of about 6 miles. The front light is *red*, elevated 27 feet above high water, shown from a black shed on piles, and visible from the bearing of N. 44° W., through west and south, to S. 44° E.; the rear (or inner) light is *white*, elevated 46 feet above high water, shown from a black lantern on piles 63 feet high, and visible

Charts, 1,965  
[2,708].  
775 [2,709].  
Var. 1<sup>o</sup> E.

runs vessels between Haifong and Hong Kong. A bi-monthly postal service is run between Haifong and Kuang-tehou, calling at Pakhoi and Hoi hau. A branch steamer of the Messageries Maritime which conducts the service between Saigon and Hong Kong calls here bi-monthly.

A regular river service of steamers is maintained between Haifong and Hanoi. The steamers use the Kua Lok canal during the dry season and the Song-chi in the wet. The latter canal flows into the Song Ka, a little above Hanoi, and is much the shorter route; unfortunately, it is shoal and interrupted by rapids, where the current is very strong. Cargo destined for Hanoi goes the same way. Hanoi (and therefore Haifong) has steam communication along the Song Ka or Red river to Laokai, the nearest frontier town to Mengtsz.

Lat. 20° 52' N.  
Long. 106° 40' E.

**Railway.**—Haifong is connected by railway with Hanoi. A railway connects Fulang-thuong with Langson on the road to Langchau. It is proposed to extend it to Nacham, on the Chinese frontier. These facilities have diverted a considerable portion of the trade which formerly went through Pakhoi.

**Telegraph.**—Haifong is connected by submarine cable with Hué, and Saigon, &c. Office always open.

**Products.**—The exportation of rice is the most important article of commerce; other exports are silk, gambier, mother-of-pearl, &c.

**Supplies** can be easily obtained. Water for drinking purposes is good; it is brought to the town by an aqueduct from the source of the Song Huong situated in the mountains of Dong Trieu, 19 miles distant.

**Repairs.**—Vessels over 300 tons capacity are built here, and repairs to vessels and machinery can be effected. A steam crane is available for lifting a weight of 50 tons.

There is a patent slip at Haifong suitable for small vessels of 100 tons.

**Coal.**—There is generally a considerable stock of coal kept here.

**Storm signals.**—Storm signals are shown from a flagstaff upon the old tower of the semaphore station at Haifong, by the International Code of Signals, except the three following special signals, namely:—

1. A red ball above a compass signal signifies a typhoon signalled from Hong Kong travelling in the direction indicated; the typhoon is more than 300 miles from Hong Kong.
2. A black ball above a compass signal signifies the typhoon is travelling as indicated, and that it is less than 300 miles from Haifong.
3. The B flag of the International Code above a black ball signifies—Order to the vessels moored to the wharves to haul off.

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General chart, 2,062 [2,708].

**Dinh Vu canal.**—The Dinh Vu canal is an artificial channel cut through the centre of Dinh Vu island, and connecting the Kua Kam with the Kua Nam Trieu. It is nearly a mile in length, 131 feet in width at high water, and has a depth of 19½ feet at low water.

The navigation of the canal is restricted to steam-vessels, and for them between sunrise and sunset only.

Every steam-vessel desiring to pass through the canal must conform to the following rules:—

1. A vessel approaching either entrance of the canal with the view of passing through it, is required to sound her steam-whistle frequently, and to hoist flag R of the International Code (red with yellow cross) at the foremast head, as warning to the dredgers.

The dredgers display a red flag at half mast when at work; this flag is hoisted to the mast head when the channel is clear. Vessels entering lower flag R to half mast, keeping it in that position until clear of the other end of the canal.

Vessels are not permitted to enter the canal unless the weather is sufficiently clear to enable them to see its further end, and to be assured that no other vessel has entered from the opposite direction.

2. When two steamers arrive at the same time from opposite directions for the canal, the one arriving by the Kua Nam Trieu must wait until the steamer coming from the Kua Kam has passed through, and must anchor if necessary.

3. Vessels in the canal are to proceed at the lowest possible speed.

Four mooring posts for securing vessels to are in position on each side of the canal; a pathway runs along both sides.

**NOTE.**—If possible, the Captain of the port of Haifong should be informed beforehand by the agents of the vessel, as to the date and time of their expected arrival, so that necessary instructions may be given to those engaged in dredging and to the pilots.

**Lights.**—See pages 473, 478.

**KUA NAM TRIEU.—LIGHTS.**—The following lights are exhibited in the Kua Nam Trieu:—

South-eastward of Dinh Vu island, on the sand bank extending therefrom, at the distance of 3½ and 2½ miles, respectively, two *fixed* lights to lead over the bar, each visible at the distance of about 6 miles. The front light is *red*, elevated 27 feet above high water, shown from a black shed on piles, and visible from the bearing of N. 44° W., through west and south, to S. 44° E.; the rear (or inner) light is *white*, elevated 46 feet above high water, shown from a black lantern on piles 63 feet high, and visible

Charts, 1,063  
[2,708].  
775 [2,709].  
Var.  $1\frac{1}{2}^{\circ}$  E.

\*Lat.  $20^{\circ} 50' N.$   
Long.  $106^{\circ} 43' E.$

between the bearings of N.  $46^{\circ}$  W., and N.  $71^{\circ}$  W. These lights in line, bearing N.  $59^{\circ}$  W., lead over the bar.

About  $4\frac{1}{2}$  miles north-north-westward of the preceding are *two fixed white* lights, exhibited from lanterns on red piles, to lead up the fairway after crossing the bar to the first bend. The front light,\* elevated 27 feet above high water, is visible from the bearing of N.  $62^{\circ}$  W., through north and east, to S.  $62^{\circ}$  E.; the rear light, elevated 54 feet above high water, is visible between the bearings of N.  $19^{\circ}$  W. and N.  $44^{\circ}$  W. The light-structures are 51 and 57 feet high, respectively, and are in line when bearing N.  $32^{\circ}$  W.

Lat.  $20^{\circ} 51' N.$   
Long.  $106^{\circ} 45' E.$

From a red pile structure, 52 feet high, at the eastern entrance of the canal cut through Dinh Vu island to the Kua Kam, a *fixed* light is exhibited at an elevation of 29 feet above high water, showing *red* from the bearing of S.  $58^{\circ}$  W., through south, to S.  $32^{\circ}$  E.; *white* elsewhere.

A *fixed red* light is also exhibited on the southern point of this entrance,  $1\frac{2}{3}$  cables from the light last mentioned; it is shown from a black iron support at an elevation of 24 feet above high water, and is visible when bearing from N.  $50^{\circ}$  W., through west and south, to East.

At the southern point of the eastern entrance to Vang Chau, a *fixed red* light is exhibited from a black beacon on piles 51 feet in height, at an elevation of 30 feet above high water, visible when bearing from N.  $22^{\circ}$  W., through west and south, to N.  $53^{\circ}$  E.

Lat.  $20^{\circ} 55' N.$   
Long.  $106^{\circ} 45\frac{1}{2}' E.$

On the Bancs d'Annam, situated N.N.E.  $\frac{3}{4}$  E.,  $2\frac{3}{4}$  miles from the preceding, a *fixed white* light, elevated 31 feet above high water, is exhibited on the eastern side of the channel, from a pole over a shed on pile structure, 52 feet high, and painted red; it is visible when bearing from N.  $18^{\circ}$  W., through north and east, to S.  $42^{\circ}$  W.

On the northern side of the junction of the Song Chang with the Kua Nam Trieu, a *fixed green* light, elevated 28 feet above high water, is exhibited from an iron pile structure 47 feet in height and painted red, which is visible when bearing from N.  $86^{\circ}$  W., through north and east, to S.  $4^{\circ}$  W.

**Buoys at entrance.**—Four iron conical buoys, each painted red and surmounted with staff and cone, are moored at about equal distances on the bar of the river, in a direction parallel to, and two-thirds of a cable north-eastward of, the line of the leading lights over the bar. The outer buoy (No. 2), situated S.  $59^{\circ}$  E.,  $6\frac{1}{3}$  miles from the outer light-structure, lies in a depth of 21 feet.

The inner buoy (No. 8), distant  $2\frac{1}{4}$  miles S.  $60^{\circ}$  E., from the same light-structure lies in 16 feet; the intermediate buoys (Nos. 4 and 6) are

respectively in 16 and 12 feet water. It is proposed to dredge a channel through the bar between the positions of buoys Nos. 4 and 8.

Charts, 1,963  
[2,708]  
775 [2,709].  
Var. 14° E.

A conical buoy, painted black, is moored in a depth of 13 feet, near the south-eastern extremity of the sand-bank extending from Dinh Vu island; it lies about 5½ cables westward of the inner (No. 8) red buoy.

**Directions.**—The bar of the Kua Nam Trieu is formed of rather hard muddy sand. Nui Deo summit in line with a clump of trees on the west point of the entrance\* bearing N. 51° W., leads over the bar in \*Lat. 20° 49' N.  
Long. 106° 47½ E.  
10½ feet at low water springs and about 20½ feet at high water springs. Vessels able to cross the bar can ascend to Kwang Yen 12 miles above the entrance. Proceeding up the river, keep the above marks on until the remarkable tree near the east point bears N.E. ¼ N., then the east bank should be approached and steered along at a distance of 2 to 3 cables. When the clump of trees on the west point bears W. by N. ¾ N., a mid-channel course will lead to Vang Chau canal; before arriving abreast this canal, keep towards the east bank, steering along it until abreast the clump south of Kwang Yen. Here the river is nearly blocked by rocks, leaving a passage near the eastern shore between the Banes d'Annam light-structure, painted red, and the conical buoy with cylindrical top-mark, painted black, about one cable westward of it. The anchorage is abreast the creek of Kwang Yen in 26 feet, muddy sand.

Above Kwang Yen the Nam Trieu becomes a creek, and communicates with the Kua Kam by several watercourses encumbered with rocks and very shallow; the principal of these is the Song Gia, which flows between mountains, among which seams of coal have been found.

The Vang Chau, a narrow and winding creek, situated 3 miles below Kwang Yen, joins the Nam Trieu and the Kua Kam one mile below Haifong. The banks are low and covered at high water, so that the passage would be difficult if stakes were not placed to show the channel; it has apparently about 10 feet at low water.

For particulars of Dinh Vu canal, see page 477.

**LAKH HUEN.**—The Lakh Huen is the most northern and eastern mouth of the Thai Binh. It communicates with the Nam Trieu by the Song Chang, 5 miles up which is Kwang Yen, the chief town of the province of that name before mentioned.

Lat. 20° 50' N.  
Long. 106° 52½ E.

**LIGHT.**—A white fixed light, elevated 30 feet above high water and visible from the bearing of S. 61° W., through west and north, to S. 29° E., is exhibited from a column surmounting an iron pile structure, painted red, erected to the southward of Mangue island.

Charts, 1,965  
[2,708]  
775 [2,709].  
Var. 14° E.

**Beacons.**—A wooden pile beacon with conical topmark, painted red, elevated 20 feet above high water, is situated about 9 cables southward of Mangue island, and 5 cables west of Pirates point, in a depth of 16 feet water.

A pile beacon with cubical top-mark, painted black, of the same height and in a similar depth of water, is situated off the west side of Mangue island.

Several beacons mark the channel leading from Lakh Huen to Ha Long bay.

Lat. 20° 45' N.  
Long. 106° 56' E.

**Bar.—Directions.**—Vessels drawing 16 feet can cross the bar at high water springs, and anchor at the mouth of the Song Chang. There is not less than 10 feet at low water to within 2 miles of Kwang Yen, but above that there is as little as 2 feet. The channel across the bar is narrow and but little protected from the sea; the marks also are distant and often indistinct. The small rock marked A (the south-westernmost of those off port Kak Ba) in line with the eastern part of the second group of the Norway islands, bearing S. 56° E., astern, leads over the bar in 19 to 21 feet at high water springs. (Rock A should be approached from the south-westward to avoid the rocks southward of the islands of Kak Ba bay.) When Pirates point bears N. 30° W., steer midway between the entrance points, and when approaching the beacon off Pirates point situated half a mile south-east of the light-structure, keep the western bank if bound to the anchorage below Kwang Yen, before mentioned.

There is a channel with about 6 feet at low water eastward of Mangue island leading to Ha Long bay. See tides at Do Son, page 473.

\*Lat. 20° 43' N.  
Long. 107° 1' E.

**KAK BA ISLAND and Anchorage.\***—Kak Ba island is about 11 miles in length in a north and south direction, about 6 miles in breadth, and attains a height of 1,083 feet, near the centre of the range running through it. Off its south extreme are several high and rocky islets, the outermost of which are named the Quille and Oreilles islets. B island, one of these, is 410 feet in height.

Between these islets and the south side of Kak Ba island is the port of Kak Ba, with a village on its north-east shore. Vessels under 20 feet draught find good anchorage here in the north-east monsoon period, but it is exposed to the south-west. The entrance is about half a mile wide between H island and the one westward of it, with depths of 4 to 5 fathoms, shoaling gradually towards the village.

For eight months in the year, during the north-east monsoon, this harbour affords shelter to numerous Chinese fishing junks. Supplies can be obtained at the Chinese village at the head of the harbour, and water from a well, but it is sometimes dry at the end of the north-east monsoon. Kak Ka bay to the north-westward is shallow.

**A patch** of one fathom lies on the edge of the 3-fathoms line west of the anchorage, N. 83° E., distant 7 cables from the summit of B island. Charts, 1,965 [2,708].

**Shoals in the approach.**—A patch of 2 fathoms lies 1½ cables north-west of the Oreilles, and one of 2½ fathoms at about the same distance south of Quille islet or Ninepin rock. At one mile S. 83° W. from the Quille is a dangerous rock with 8 feet water,\* and a depth of 4 to 7 fathoms close around. A rock with one fathom water, lies a cable west of the islet, situated about 2 cables south-east from the south end of H island. Lat. 20° 41' N.  
Long. 107° 0' E.  
Var. 14° E.

**Directions.**—To enter port Kak Ba, steer for H island, easily recognisable by its conical summit. The west extreme of H island, kept northward of N. ½ E., leads eastward of the 8-feet rock; and the same point kept eastward of N.N.E. ¼ E. leads to the westward. The north-west extreme of H island should be passed at about the distance of a cable. Vessels drawing less than 14 feet can enter the harbour from the south-eastward, passing between high precipitous islets about three-quarters of a cable apart. See view on Chart No. 1,169.

### THE FAI TSI LONG ARCHIPELAGO.

**General remarks.—Anchorages.**—North-eastward of the Song Ka delta, the coast of Tong King to the Chinese frontier is bordered by innumerable high rocky islands and islets of limestone formation, presenting a most varied form, with sharp or rounded, though distinct, summits, some of them attaining a height of about 1,000 feet. The Norway islands make a good landfall, whilst the island of Lai Tao, with its conical summit on the east side of the approach to Ha Long bay, and the look-out hill, 980 feet in height,\* on the north side of Ha Long bay, Lat. 20° 58' N.  
Long. 107° 1' E. are conspicuous objects.

Among these island are several deep-water channels which lead to secure anchorages, the only ones available for large vessels on the coast of Tong King. The principal channels are:—

Henriette pass, which leads to Ha Long bay, where there is good and secure anchorage in depths of 5 to 8 fathoms, northward of Surprise island, with not less water in the approach. Lat. 20° 45' N.  
Long. 107° 9' E.

The Tai co tai channel, westward of Henriette pass and of Paix island, leading from Lan ha bay to Crapaud road and thence to Ha Long bay.

The Casque and Mouche passes which lead into Saone channel and Fai Tsi Long bay, where there are depths of 7 to 12 fathoms; the approach is common to both, and has a depth of 4 to 5 fathoms at low water over a flat, about 5 miles in length; the Casque pass is the wider and deeper of the two.

General chart, 2,062 [2,708].

E 32369.

H H

Charts, 1,965

[2,708].

1,169 [2,711].

Lat. 20° 58' N.

Long. 107° 32' E.

Var. 14° E.

Pak ha mun also affords secure anchorage in about 8 fathoms, with 6 to 7 fathoms in the approach.

These anchorages afford fair shelter during typhoons, being practically landlocked; the holding ground is good. Within them and along the coast to the north-eastward are other secure anchorages, and a smooth water channel available for vessels of light draught with local knowledge.

During the strength of the north-east monsoon there is a considerable swell in Fai Tsing bay, but in the others it is scarcely felt.

From a distance, these islands appear to form a compact mass, but on being approached the channels through them will be distinguished. Some of the islands are inhabited, and the archipelago has always been a refuge for Chinese pirates. No supplies are obtainable and water is scarce.

**Climate.**—The heat in summer is greater among the islands than in the delta or to seaward, on account of the islands obstructing the breeze; the thermometer at this season sometimes shows 100°. The lowest temperature in the winter is 46° to 50°.

From December to March fogs are frequent and persistent.

**Tides.**—It is high water, full and change, at Fai Tsing archipelago at about 5 hours, the same as at Do Son, but the rise is somewhat greater and increasing towards the north, it being 12½ feet at Ha Long, and 14 feet at Kebao. The tidal streams among the islands attain a rate of 2 knots an hour in places where confined; in the offing the streams run from one to 1½ knots an hour; the flood coming from the south-west, and the ebb from the north-east; off Kebao the streams run nearly tide and half tide.

**DANGERS in the Offing.**—The Norway islands are referred to on page 468.

Lat. 20° 39' N.  
Long. 107° 4' E.

**Ta Lao pai or Offing rock**, which is low compared to the Norway islands, lies between them and the Quille or Ninepin rock. A pinnacle rock having 5 feet water, with depths of 6 to 8 fathoms, coral bottom, close to, and 12 fathoms, mud, within a short distance, lies two-thirds of a mile N.W. ¼ N. from Ta Lao pai.

**Sam poni tsao or False Ninepin**, lying 3 miles eastward of Ta Lao pai, is a pointed rock, the eastern of a group of three islets.

Lat. 20° 41' N.  
Long. 107° 20' E.

**Chi li pai**, lying about 9 miles N.E. by E. of the most eastern of the Norway islands is a group of rocks nearly a mile in length in an east and west direction, some of which are always covered; a rock 6 feet high is situated near its eastern extreme, and one always above water lies near its west extreme.

At  $1\frac{1}{4}$  miles northward of Chi li pai is a reef, dry 9 feet at low water [Charts, 1,905  
springs; and at 2 miles North, is a rock about three-quarters of a cable in [2,708],  
length, with  $2\frac{1}{2}$  fathoms least water over it, from which the south extreme  
of Timatao bears N.E. by E.  $\frac{5}{8}$  E., distant 3 miles. Var. 1,169 [2,711].  
Var. 113 E.

**Cape Koan Lan or Koan Lan islands**, the southernmost of which is 6 miles from the cape of same name, are composed of four lofty and precipitous islands, from one to  $2\frac{1}{2}$  miles in length, named Lai Tao (the outermost)\*, Siong Lai Tao, Timatao, and Fong Wong, and several smaller ones. Fong Wong is 771 feet in height. The depths between them range from 4 to 6 fathoms, with patches in places, as shown on the chart. Between Siong Lai Tao and the cape is Kuo pui tao, surrounded by a reef, and between the two islands mentioned is a rock awash at low water, nearly connected with Siong Lai Tao by a reef. The summit of the island westward of Timatao, open northward of Timatao, leads northward of the rock.

Craft, with local knowledge, pass between the islands, and there is temporary anchorage amongst them, but the locality is better avoided by strangers. The bay westward of the cape is shallow, with numerous fishing stakes.

**HA LONG BAY and Port Courbet approaches.**—Ha Long bay, situated northward of the island of Kak Ba at the north-west extreme of the Fai Tsi Long archipelago, is about 5 miles in extent, and very shallow, except the narrow southern portion of it, which part is available for all classes of vessels.\* On its north-eastern side is Hamelin channel leading to port Courbet, in which there is a least depth of about 10 feet at low water.

There are also channels leading eastward through Fai Tsi Long bay and archipelago, and to the westward is a channel for vessels of light draught, with 6 feet at low water, leading to Lakh Huen and the delta of the Song Ka.

**Entrances.**—The principal entrance to Ha Long bay is the Henriette channel, page 485, which is available for all classes of vessels, with anchorage between Surprise and Index islands in depths of from 6 to 8 fathoms ; above this the water decreases gradually.

The Tai co tai channel, or Entrée Profonde, westward of Henriette pass and of Union and Paix islands, and leading from Lan ha bay, is narrow, but deep as far as Crapaud road, whence to Ha Long bay by either the Volta channel or Arche pass, there is at low water as little as  $3\frac{1}{2}$  fathoms in places. All these channels are equally used and said to be easily navigable after a first visit, but the Henriette only should be used by vessels above moderate draught, not only on account of its greater depth, but being much wider, there is less tidal stream.

\*Lat.  $20^{\circ} 52' N.$   
Long.  $107^{\circ} 54' E.$

Charts, 1,965  
[2,768].  
1,169 [2,711].  
Var. 11° E.

### Anchorages, see page 486.

**Pilots.**—There is a pilot station at Hougai, at the entrance of port Courbet, from whence pilots go out to the mouth of the Henriette channel when a vessel is expected.

To ensure having a pilot for entering Fai Tsi Long bay, a vessel should take one in off the Kua Kam, near Hon Dau.

Lat. 20° 48' N.  
Long. 107° 54' E.

**LAN HA BAY**, situated about 7 miles northward of the Norway islands, is about 2 miles wide between Paix island and the islets fronting the mainland to the westward, with good anchorage, in depths of 8 to 9 fathoms, easy of access. The eastern side of the bay, formed by Paix, Union, and other islands, is high, steep, and nearly continuous; on the western side are deep inlets and numerous islets, also affording secure anchorage. The passage between Union and Paix islands is barred by a ledge of rocks.

Lat. 20° 42½' N.  
Long. 107° 44' E.

**Su li pai reef**, which dries 9 feet, is the only danger in the bay; it lies on the western side of Lan ha bay, 9 cables N.E. by E. from M islets, a small group situated 1½ miles east-north-eastward of Quille or Ninepin rock. A rock, about 1½ cables in diameter, with a depth of 4 feet over it, lies S. by E. 1¼ cables from Su li pai reef.

Les Oreilles open northward, or the Ninepin rock open southward, of the M islets, leads clear of Su li pai reef.

**Anchorage.**—There is good anchorage for small vessels in about 4 fathoms about 1½ miles to the north of M islet, and westward of the outer islets on the west side of Lan ha bay. Like Kak Ba, this anchorage is used by vessels waiting for water on the bar of the Kua Kam. A rock, uncovered at low water, lies in the southern channel leading to this anchorage, and a second rock, awash at low water, lies in the north-east channel; both these rocks will be avoided by keeping towards the island on the starboard hand when entering either channel.

**Tai co tai (Entrée Profonde)** is the channel leading northward from Lan ha bay to Crapaud road, and has not less than 8 fathoms water, though it is narrow.

**A rock**, covered with 10 feet water, lies three-quarters of a cable W. by S. ¾ S. from the south-western islet, situated westward of Saddle mountain on Union island. The Su li pai reef, on the west side of approach, has been previously mentioned.

**Parseval bay and port Bayard** afford excellent protection to vessels of light draught, in 2 to 3 fathoms, in case of a typhoon; but the entrances are narrow, especially that of the latter, the width between the rocks on either side being only 80 yards.

Lat. 20° 49' N.  
Long. 107° 5' E.

**Crapaud road**, entered from Lan ha bay, by the Tai co tai, or from the eastward by Crochet pass, affords good and sheltered anchorage in 7 fathoms, mud, with Crapaud rock, bearing S.S.E. ¼ E., distant about

General chart, 2,062 [2,706].

two-thirds of a mile. This sheltered anchorage is the most accessible for [Charts, 1,963  
a large vessel, expecting a typhoon, when in the neighbourhood of Kak Ba 1,169 [2,711].  
or the Norway islands. Var. 1 $\frac{1}{2}$ <sup>o</sup> E.

**Volta channel and Arche pass.**—Either of these lead to Ha Long bay, and each have a least depth of 21 feet at low water springs; the former is the straighter of the two, and it is only necessary to keep in mid-channel. To enter the Arche from Crapaud road, keep close along the islets on the south side of Crochet pass, thence passing a little westward of those northward of Grottes island. Then steer up through the fairway into Ha Long bay.

**HENRIETTE CHANNEL**, the best approach to Ha Long bay Lat. 20° 45' N.  
Long. 107° 9' E. and port Courbet, lies between an islet named Henriette point, and Orange islet, 150 feet high, lying one mile eastward of the above islet. Orange, South-east, and Jonque islets on the eastern side, appear detached when approaching the channel, whilst those to the westward seem to form with Paix island a compact mass. A reef is charted as extending 4 cables southward from Henriette point island.

**Dangers.**—The only known dangers in Henriette channel are: a rock, with 3 feet water, 4 cables westward of Jonque islet, with Orange islet, bearing S. by E.  $\frac{3}{4}$  E., distant one mile; a patch of  $2\frac{1}{2}$  fathoms  $1\frac{4}{5}$  miles N. 6° E. from Yuyu islet, and a patch, of  $3\frac{1}{4}$  fathoms, about half a mile north-west from this latter danger; they are all a little eastward of the fairway. There is a patch of one fathom 2 cables north-west of Yuyu islet on the west side, and a patch of 3 fathoms beyond, but these are fairly guarded by that islet.

**Directions.**—The east point of the eastern group of the Norway islands, kept bearing S. by E.  $\frac{3}{4}$  E., astern, leads to the entrance of Henriette channel, which from thence extends for a distance of more than 10 miles between numerous islands to Ha Long bay. Its least width is about a third of a mile, and in the fairway there is not less than 7 fathoms until abreast Surprise island, where there is good anchorage.

When abreast Orange islet, three low rocks will be seen on the west side of the fairway, namely, Budha, Canot, and Yuyu: the latter bearing N.N.W.  $\frac{3}{4}$  W., will lead westward of the 3-feet rock, westward of Jonque islet. A ledge of rocks, with a depth of  $2\frac{1}{2}$  fathoms over it, extends eastward about three-quarters of a cable from the Canot rocks, to which a good berth must be given. The Nez islet,  $3\frac{1}{4}$  miles above Yuyu, has a saddle and is easily recognised. Index island, seen midway between it and Dragon island, bearing N.N.W., leads up the fairway well westward of the  $3\frac{1}{4}$ -fathoms patch; the same bearing being followed will lead eastward of the  $4\frac{1}{2}$ -fathoms patch, south-east of Tré pied island; and when abreast Moine island, haul to the westward if seeking anchorage in Ha Long bay.

Charts 1,065  
[2,705],  
1,169 [2,711]  
775 [2,709].  
Var. 14° E.

\*Lat. 20° 52' N.  
Long. 107° 43' E.

Or if bound to port Courbet, pass eastward of Index island for Hamelin channel.

**HA LONG BAY.—Anchorages.**—There is secure anchorage for vessels of deep draught, in depths of 6 to 8 fathoms, mud, good holding ground, between Surprise and Index islands, where the channel (Henriette) is one mile wide, and it is much cooler here than farther in, being more open to the sea breeze. About one mile above there is anchorage in 5 to 6 fathoms abreast Hospital island\*; above this there is anchorage for vessels of light draught as convenient. The other channels leading from these anchorages are marked by pecked lines.

The anchorages mentioned are about 6 miles, in a direct line, from the coaling station in port Courbet.

A rock, with  $1\frac{1}{2}$  feet water over it, and depths of  $2\frac{1}{2}$  to 3 fathoms around, lies 2 to  $2\frac{1}{2}$  cables W.S.W. from the south end of Tourelle island.

**Supplies.**—Fishermen frequent the bay, from whom fish are procurable. Provisions are brought from Haifong, and water can be obtained on the island of Kak Ba, and on either side of the entrance to port Courbet.

**Channel to Haifong.**—It is intended to make a channel leading to Haifong, through the Grande Bréche passage and Ha Nam island, via the Kua Nam Trieu.

**PORT COURBET or HONGAI BAY.—Hamelin channel.**—The deepest channel to port Courbet is the Hamelin, which connects with Henriette channel eastward of Index island. From that island it leads south-eastward of Tourelle, westward of Frangé and Toque islands, between Longue and Polichinelle, and southward of Campement, Repos, and Chenal islands.

The only sunken dangers are a rock which dries 2 feet, situated on the north side of the fairway, at about a cable southward of the east end of Campement island, about a mile below the bar; and a sandbank which dries one foot, lying northward of the channel over the bar, between Cone and Repos island.

**The bar** which lies between the two latter islands has been dredged to a depth of 15 feet at low water springs over a width of about 40 yards, and is marked on its south side by three pile beacons, with cubical topmarks, painted black; springs rise about 12 feet.

Lat. 20° 55' N.  
Long. 107° 6' E.

Lat. 20° 57' N.  
Long. 107° 3' E.

**Entrance.**—Kua Luk, the entrance to port Courbet, is about 2 cables wide, with depths of 9 to 10 fathoms, but at a mile to the northward the bay is all dry at low water, and there are extensive banks dry at low water on either side within the entrance.

General chart, 2,062 [2,706].

**Anchorage.**—Vessels should anchor about 4 cables westward of Bayard island, away from the entrance, as the tidal streams are very strong in it; the bottom is mud.

The fort on the west point of the entrance, mount Buisson, and Jaune hill on the eastern side of the bay are conspicuous objects.

**Villages.**—On the north shore, which is chiefly mangrove, are several villages; they offer but few resources. At Fu Troi, on the north-west arm, is a market, and on the north-east arm a Chinese village where firewood is obtainable.

**Coal mines.**—The river on the eastern side of the port is only practicable for boats for about a mile up. The Nagotna coal mines are situated about 3 to 4 miles up this river, connected with the coaling wharf at Hongai by a railway. The output from the mines was about 267,333 tons in the year 1903; the coal was said to be of good quality.

About 60 Europeans are employed here in connection with the miles, and there is a club, post office, telegraph office, custom-house, &c.

**Supplies.—Coal.**—There are two wharves at Hongai, one of wood with a frontage of 263 feet, and one of stone 230 feet in length; the depth alongside each is 20 feet at low water. These wharves are provided with hydraulic and motor cranes, and 200 tons of coal an hour can be delivered to vessels alongside. Vessels in the roadstead can be coaled by lighters at the rate of 50 tons an hour.

Slaughtered and live stock, poultry, game, vegetables, fruit, and fish, can be procured at Hongai. Water is scarce, but can be obtained of good quality through the Chinese who bring it from up-river in native craft; the process of watering, however, is tedious.

**Repairs.**—There is a workshop here with forges, foundries, and fitting shops, and the repairing of ships is undertaken.

**Communication.**—There is steamer communication with Haifong three times a week.

**FAI TSI LONG BAY** is the largest bay of the Archipelago, but on account of its distance from the delta of the Song Ka is not of so much importance as Ha Long bay: it is more a thoroughfare to the channels within the islands which afford smooth water to craft with local knowledge proceeding up or down the coast; there are no hidden dangers known in the bay itself.

The bay is accessible from Ha Long bay by the Ducouedic and Chateau Renaud channels; from seaward by the Henriette *via* the Ducouedic, and by the Aspic, Casque, and Mouche channels. Vessels of deep draught can proceed to within 4 miles of port Kamfa by the three last mentioned; the Henriette has been described.

Charts, 1,903  
[2,708].  
Lat. 20° 51' N.  
Long. 107° 8' E.  
Var. 11° E.

**Ducouedic channel** is the deepest channel from Henriette pass and Ha Long bay to Fai Tsi Long bay. It has a least depth of about 4 fathoms at low water, but there is less water in the bay itself where it enters. It connects with the Henriette westward of Sac island, and there are only two known dangers in it, namely, Le Sampan rock, covered at high water, which is avoided by keeping Dragon island open westward of Sac island; and a rock which dries 9 feet, south-westward of Entrée island in the northern part, which is avoided by keeping Kepi island open westward of Enclume rock.

Lat. 20° 56' N.  
Long. 107° 12' E.

**Chateau Renaud channel**, in common with the Hamelin, branches from the Henriette channel at Index island and is the inshore channel through Fai Tsi Long bay north-eastward. It carries about 15 feet at low water into the Bourayne channel. The only sunken danger is a rock which dries 3 feet, situated 6 cables E.N.E. of Dome island; it is avoided by keeping the island on the southern side of the channel close aboard.

Lat. 20° 48' N.  
Long. 107° 13' E.

**Aspic pass** is straight, about 5 miles in length, and with a depth of 3½ fathoms at low water on the pecked line, eastward of Escargot, the inner island, which, however, is ample for all vessels likely to enter. Approaching from the south-westward, and being off South-east island of Henriette channel, that island should be kept midway between the west extreme of the Norway islands and Sam poni tsao (False Ninepin) astern, which will lead to the entrance of the pass, westward of Mere island and Enfant rock and of Arche islet. From abreast the latter, Escargot island will be seen between Pont island and the islet westward of it, bearing N. 8° E., which being steered for will lead up the fairway of the pass clear of danger. Pass into Saone channel, the eastern part of Fai Tsi Long bay; thence by Bourayne channel if bound north-eastward, or anchoring in 7 or 9 fathoms eastward of Milieu island if requisite. The tidal streams are very strong abreast Pont island where the channel is only a cable in breadth.

The Brandon, Pluvier, and Vaico passes lead from the Aspic to the Ducouedic channel and thence to Ha Long bay or Fai Tsi Long bay.

**Casque and Mouche passes**, have a common approach, which is between Entrée island and the island 1½ miles south-east of it. The only known dangers, are a rocky patch of 3 feet, situated near the fairway, at 4 cables S.S.W. ¼ W. of Haute island; a rocky bank with from one to 3 feet over it, 1½ cables S. 32° E. from the north-eastern point of Entrée island; and a rock with a depth of one foot over it, about half a cable to the north-eastward of the same point.

Sam poni tsao or False Ninepin bearing S.W., astern, leads to the entrance; and when Mouche rock, which is low, is seen opening of the east end of Deux Passes island, bearing N. ¾ E., steer for it in line with

that extreme, which leads westward of the 3-feet patch and to the junction of Casque and Mouche passes.

**Casque pass** is straight and available for all classes of vessels. Casque island seen between the islands on either side of the channel, bearing N.  $50^{\circ}$  W., leads, up clear of danger. When at about half a mile from that island, edge to the eastward to pass midway between it and the islands to the eastward, to avoid the  $3\frac{1}{4}$ -fathoms bank southward of the Casque; thence into Saone channel. A  $4\frac{1}{2}$ -fathoms patch lies in the fairway 2 cables east-north-eastward of Verte island.

**Mouche pass** is also deep but the tidal streams are very strong, especially abreast the south end of Biches island. From the junction with the Casque, steer to pass between Deux Passes island and that eastward of it and also eastward of Mouche rock. Then, steer with the rock in line with the east extreme of Deux Passes island, astern, until the summit of Aigle island is touching the north-west extreme of the narrow island forming the north-east end of the pass, bearing N.  $17^{\circ}$  W., which leads up the fairway; thence keep the western shore aboard into Saone channel.

**Inshore channels from Fai Tsi Long bay.—General remarks.**—There are several channels leading along shore north-eastward from Fai Tsi Long bay for a distance of about 30 miles, to the Kua Mo; these all connect at Donjon island, 8 miles westward of the Kua Mo. About midway is Colosse island, 738 feet in height, upon which all the channels converge.

The depths on the several bars are not anywhere less than 14 feet at low water springs, but the Bruyères pass which leads to sea, *via* the Tsing Mun and the bar from the inshore route to the Kua Mo, have only the depth mentioned. The inshore route can be resumed by entering the Ko Kai Mun, 3 miles eastward of the Kua Mo, for a further distance of about 25 miles, within Grand Singe, Chateau Renaud, and Tsing Mui islands, emerging at Kua Tam eastward of the last-mentioned island.

The sunken dangers are very few, steep-to islands generally forming the channels, but the tidal streams are strong in the narrow portions. This route offers considerable advantages during the north-east monsoon period for light-draught or small-powered steamers, but it is not recommended to those without local knowledge or without the assistance of a pilot. The rise of tide at springs is from 12 to 14 feet. The tracks to be followed are marked by pecked lines which will afford better information than any written description. The following are the principal channels:—

**Saone and Bourayne channels.**—Vessels of all classes can reach Saone channel and the Bourayne, its continuation eastward, from sea by the Aspic, Casque, and Mouche passes, before described, and there is

Charts, 1,965  
[2,708].  
1,169 [2,711].  
Var.  $14^{\circ}$  E.  
Lat.  $20^{\circ} 53' N.$   
Long.  $107^{\circ} 16' E.$

Charts, 1,965  
[2,708],  
1,169 [2,711],  
776 [2,712].  
Var. 1 $\frac{1}{2}$ ° E.

good anchorage in depths of 5 to 10 fathoms in them. The Bourayne is the approach to port Kamfa; Pouce islet, touching the south side of Dent island, bearing N. 59° E., leads through it. At one mile eastward of Dent island is a bar with 14 feet at low water over it, leading into Kersaint channel.

Lat. 21° 0' N.  
Long. 107° 24' E.

**Kersaint channel**, leading from Saone channel southward of Bourayne channel and close northward of Roussé island, has about 3 $\frac{3}{4}$  fathoms over a bar near the centre of that island, and in other places from 6 to 8 fathoms. It is free from sunken dangers other than a rock which nearly covers at the highest springs, situated 2 cables northward of the islet northward of Dome island (442 feet in height), eastward of the fairway and near its junction with the Bourayne channel.

Lat. 21° 3' N.  
Long. 107° 25 $\frac{1}{2}$ ' E.

**Duchaffaut channel** is the continuation north-eastward of the Bourayne and Kersaint channels; it is straight, easily navigated, and has a bar with 3 fathoms at low water over it, between Doigt and Echelle islets, but there is scarcely better water in the fairway beyond until near its junction with the Lynx channel at Donjon island. There is only a depth of 14 feet over the bars giving access to the sea to the north-eastward as mentioned in the general remarks, page 489.

Lat. 20° 56' N.  
Long. 107° 23' E.

**Roc aux Aigles channel**, southward of Roussé island, also leads eastward from Saone channel, and nearly parallel to the north coast of Longue island. The shoalest water is over the bar half a mile in length, situated about a mile westward of Roc aux Aigles, a rocky mass 672 feet in height on the north coast of Longue island, and one of the most conspicuous objects in the archipelago. The only danger is the sunken rock on the bank which extends north-eastward of Boisé island, westward of Moustique rock; it will be avoided by keeping the Roc aux Aigles open northward of Coin islet until Brioche island bears East.

Lat. 21° 5' N.  
Long. 107° 28' E.

**Lynx channel** is the continuation northward of Roc aux Aigles; it has a bar with 3 fathoms at low water north-eastward of Colosse island (738 feet high). The principal dangers are Echelle rock, which dries 6 feet, on the west side of fairway, between Echelle and Saone islands; and Lynx rock, having less than 6 feet water over it at low water, on the west side of fairway, with Diadème rock of 2 $\frac{1}{2}$  fathoms abreast it on the east side of fairway, both lying between Lion and Diadème islands.

The summit of Colosse island seen midway between Coude and Chat islands (astern), leads between these dangers.

About 2 miles north-eastward, the Lynx connects with the other channels at Donjon island, as before mentioned.

**Carabine channel** is the continuation north-eastward of the Roc aux Aigles channel; it leads to sea through Surprise channel and Kua Doi or Pak ha mun pass in not less than 3 $\frac{1}{2}$  fathoms water. The only danger

is the shallow bank, situated  $1\frac{1}{2}$  cables southward of Touffe island, and it will be avoided by keeping close to the island.

Charts, 1,905  
[2,703]  
1,769 [2,711]  
776 [2,712].  
Var.  $1\frac{1}{4}$ ° E.

**Lutin channel**, southward of Longue island, has not been properly surveyed; it leads to Port des Sylphes, the entrance of which is very narrow with a depth of 16 feet in it close to the northern shore; there is somewhat less water within.

**Kamfa port and channel**.—Vessels of any draught can approach Kamfa as far as Bourayne channel, about 3 miles from the entrance to the port, as before stated.

Kamfa channel, in the entrance of which is port Kamfa, leads to Tien yen, distant about 16 miles, and is available for small steam craft towards high water; thence it leads to sea by the Kua Mo.

The entrance to the port is about a mile wide, but it is nearly all occupied by Jaune and Parseval islands. The entrance points are fronted by spits mostly dry at low water to the distance of  $3\frac{1}{2}$  miles to the southward, to Bourayne channel, between which is a narrow channel with  $3\frac{3}{4}$  fathoms at low water. Eastward of Jaune island there is but  $3\frac{1}{2}$  fathoms in the channel, but above it deepens to 6 and 8 fathoms abreast Parseval island, being again reduced to  $3\frac{1}{2}$  fathoms northward of that island; farther up there is anchorage in a depth of 4 to 5 fathoms, good holding ground.

The passage westward of Jaune and Parseval islands is shallow, only about one fathom at low water.

**Directions**.—From Bourayne channel the course is close along Angle islet and the islets southward of it, until the whole of Jaune island is open of Sud de la Pass point, when Jaune island bearing N.  $1^{\circ}$  E. will lead up the fairway. From abreast Sud de la Pass point, steer midway between Jaune and Verte islands, avoiding the reefs extending southward from both. If proceeding above Parseval island, care must be taken in passing between the reef extending from that island and the rock which dries 8 feet abreast it.

The anchorage of Kamfa being of small extent diminishes the importance which it might have if the outcrop of coal which is visible in many places on the surface should prove rich enough for being worked extensively, and to call for the construction of wharves.

**Kebao**, an inlet in the inshore channel, situated about  $8\frac{1}{2}$  miles north-eastward of port Kamfa, acquired importance from the coal mines found at that place. The Company's establishment is situated at port Wallut, on the south shore of the Kua Mo, southward of Pirates island, distant about 6 miles. It was proposed to connect it with the Kamfa mines by a railway, but it has since been stated that the mines are not proving sufficiently profitable. The output in 1903 amounted to 5,586 tons. (See page 497.)

Lat.  $21^{\circ} 7\frac{1}{4}'$  N.  
Long.  $107^{\circ} 29'$  E.

Charts, 1,965  
[2,708];  
1,169 [2,711],  
with plan, 776  
[2,712].  
Lat.  $20^{\circ} 58' N.$ .  
Long.  $107^{\circ} 32' E.$ .  
Var.  $1^{\circ} E.$ .

**PAK HA MUN or Kua Doi.**—This channel, situated near the centre of the sea-face of the archipelago, affords access to the Inner route by Carabine channel.

The island forming the eastern shore is high and completely wooded whilst that to the westward presents grassy slopes, topped by clumps of trees. The western shore is shallow to a line joining the west point of entrance to the Fer-à-Cheval, a group of rocks rendered conspicuous by the sandy shore behind them.

Its entrance is about 3 cables wide between Entrée and Bosse peaks, and may be distinguished by mount Pak ha mun, 1,302 feet in height, directly within it, and by Table mount, 1,444 feet in height, about  $2\frac{1}{2}$  miles to the southward of the former. There are depths of 6 to 7 fathoms in the approach and there are no known dangers; in the entrance the water is much deeper, but a short distance within it is reduced to about 7 fathoms, and here there is good anchorage. Mount Pak ha mun bearing N.  $49^{\circ} W.$ , leads in through the entrance, from whence the eastern shore should be kept, anchoring when Bosse peak bears E.  $\frac{1}{2}$  N.

Better shelter, however, is obtained by keeping along the eastern shore to abreast Pirate bay, where there is anchorage in 4 fathoms. The anchorage is secure here even during typhoonous, but the tidal stream runs with considerable strength. The middle ground, about  $1\frac{1}{2}$  miles in length, with as little as 2 feet in places, occupies the greater portion of the channel.

Proceeding northward from Pirate bay to the Surprise or Carabine channels, by keeping the summit of Cone island in line with the west side of Gourde island, a vessel will be in the fairway marked by the pecked line; when about half a mile from the latter island, steer to pass about a cable eastward of it; thence by the pecked line for Carabine channel, page 490, or as requisite for Surprise channel.

**Tides.**—See page 493.

**Supplies.**—Water is obtainable in Pirate cove; oysters and game are abundant, and fish is procurable from the fishermen.

Lat.  $21^{\circ} 45' N.$ .  
Long.  $107^{\circ} 34' E.$

**Surprise channel** leads from Pak ha mun northward to Tsien Mun and Bruyères pass, and has apparently not less than 3 fathoms in the fairway. A patch with  $2\frac{3}{4}$  fathoms lies 4 cables south-east of the south point of Noire island.

**Madeleine** is the name of the large island which separates Surprise channel from those farther in shore.

**COAST.—General Remarks.**—The Fai Tsi Long archipelago may be said to end near the Pak ha mun entrance. From this point northward to cape Pak Lung the curiously-shaped rocks of the archipelago

are succeeded by hills covered with trees and dense jungle extending to the shore. Inland are mountains ranging from 4,000 to 5,000 feet in height only visible in clear weather, whilst at varying distances from the shore are long and narrow islands, ranging from 400 to 500 feet in height and lying parallel to the shore, within which is a smooth water channel similar to that through the archipelago and affording also well sheltered anchorages. Mention of this has also been made on page 489.

**Tides.**—The range of the tide increases towards the north-east. From 14 feet at springs at Kebao it attains to  $16\frac{1}{2}$  feet at Tsieng Mui point, Pak Lung, and Pakhoi. The tidal streams are stronger, more especially in the narrow passages between the islands. Slack stream corresponds nearly with high and low water, the flood setting north-eastward and the ebb southward, at about 2 knots in the offing. At Tsieng Mui island, Kua Tam entrance, it is stated to be high water at full and change one hour in advance of Do Son, or at 4h., whereas at the Kao Tao islands in the offing it is given as 7h. 8m.

**TSIENG MUN** entrance to the inshore passage is situated about 10 miles northward of Pak ha mun, and westward of the Kao Tao Shan islands.

Its entrance is about three-quarters of a mile wide between Tsieng Mun point and Boisée island, with a depth of 8 to 10 fathoms, with good holding ground a short distance within, in the same depths. Vessels of light draught can proceed farther in to Surprise channel, and find more complete shelter.

The deepest approach is from the southward, close along Ba Mun island, where the depth is apparently from 6 to 7 fathoms within the dangers westward of the off-lying islands; the approach northward of the island is over a bank with depths of  $3\frac{3}{4}$  to 5 fathoms.

**Dangers.**—Hugon rock with  $1\frac{3}{4}$  fathoms water lies half a mile E.S.E. of the south point of Sanglier island, on the north side of the approach. A bank with less than 6 feet is charted S.  $\frac{1}{2}$  E.,  $4\frac{1}{2}$  miles, a sand bank with rocky heads with  $1\frac{1}{2}$  fathoms S.E., distant  $2\frac{3}{4}$  miles, and another of same depth (P.D.) E.S.E., distant  $4\frac{1}{2}$  miles, all from the south point of Sanglier island. Other dangers may exist, as the ground has not been thoroughly examined.

**Bruyères pass** leads from Tsieng Mun to the inshore channel to Kebao, &c. It lies between Bruyères island and the extensive banks eastward of it, has a depth of 14 feet at low water and 29 feet at high water springs over its bar, the mark for which is the north extreme of Tsieng Mun rock midway between Tsieng Mun point and the remarkable tree within it. The north extreme of the rock must be kept in line with

Lat.  $21^{\circ} 8' N.$   
Long.  $107^{\circ} 38' E.$

Lat.  $21^{\circ} 9\frac{1}{2}' N.$   
Long.  $107^{\circ} 34\frac{1}{2}' E.$

Charts, 1,965  
[2,708].  
776 [2,712].  
Var. 14° E.

Lat. 21° 9' N.  
Long. 107° 34' E.

the tree to clear the reef extending northward of Bruyères island. A vessel must be prepared to meet a strong tidal stream when abreast the island.

From Bruyères island southward, the inshore channel leads to Kebao, port Kamfa, &c., as previously described.

From Bruyères island northward the inshore channel is barred by a bank which connects Longue island with the south point of entrance to the Kua Mo, over which is a depth of 13 feet at low water, nearly the same as in Bruyères pass. This bar, though narrow, is composed of sand and gravel, unlike the bars in the Fai Tsi Long archipelago, which are of mud. The half-wooded summit of Grand Singe island in line with the east extreme of Plage island leads over it in the best water.

**Little Tsieang Mun** is the narrow passage between Boisé and Sanglier or Tsieang san island, and is of no importance.

**The KAO TAO ISLANDS (Gautau)** are a cluster of bare islands situated in the approach to Tsieang Mun, and from 7 to 14 miles off shore. They occupy a space about 15 miles in length in a north-east and south-west direction and about half that distance in breadth; the spaces between the islands are mostly encumbered with dangers, for which see the chart.

Tsieang Lan Shan, the largest and easternmost islet, is  $4\frac{1}{2}$  miles in length by  $1\frac{1}{2}$  miles in breadth, and about 500 feet in height. Its southern extreme is composed of red steep cliffs. Smaller islands lie near its extremes and within it.

Sha Pak Wan is an irregularly shaped island nearly 4 miles in length, with a cone summit 541 feet in height on its northern end.\* The southern portion is composed of red cliffs about 100 feet high, and is connected with the northern end by a low isthmus. Dangers extend 2 miles or more westward of this island, the limit of which has not been defined.

\*Lat. 21° 1' N.  
Long. 107° 43' E.

†Lat. 21° 9' N.  
Long. 107° 51' E.

Mashao and Tshim shan, the latter 541 feet in height with a cone summit†, are the north-easternmost of the group. Patches of  $5\frac{1}{2}$  fathoms are charted between these islands and Lo shu shan islands, with depths of 9 to 10 fathoms in their vicinity.

Lat. 21° 3' N.  
Long. 107° 41' E.

**Uli pai reef** lies about  $2\frac{1}{2}$  miles north-west of Sha Pak Wan and dries at low water. The dangers between this reef and Tsieang Mun have been previously mentioned.

**Anchorage.**—There is anchorage for vessels of about 15 feet draught in the space between Tsieang Lan Shan and Sha Pak Wan. The south entrance is about half a mile wide between the reefs extending from the islets on either side, with a depth of 6 to 8 fathoms, decreasing within. A reef with 3 feet water lies about 2 cables westward of the northern of

the two islets on the eastern side. The course in is about N.N.W. The anchorage is northward of the sunken reef, in 4 to 5 fathoms, and is sheltered from northerly winds, but open to the wind and swell from the southward. It would be advisable to mark the reef if entering. H.M.S. *Egeria* anchored here in 1876.

Charts, 1,065  
[2,708].  
776 [2,712].  
Var. 14° E.  
Lat. 21° 0' N.  
Lat. 107° 46' E.

The islands have been hitherto little inhabited on account of the incursions of pirates who destroyed the houses and crops. The ground appears fertile, but the hills are almost denuded of trees, a feature by which this group may be distinguished from the group off cape Koan Lan, which are all thickly wooded.

**Tides.**—It is high water, full and change, at about 7h.; springs rise from 13 to 15 feet.

**LO SHU SHAN ISLANDS.**—This group, consisting of three islands and several rocks, are situated about 7 miles north-eastward of the Kao Tao group, and about the same distance southward of Tsieng Mun island.

**Lo shu shan**, the largest and northernmost islet of the group, is 2 miles in length, east and west, one mile in breadth, and 614 feet in height near the centre. The north shore is foul to the distance of nearly a mile, there being a patch of 7 feet at 9 cables off the centre of the north shore. The eastern shore is foul to the distance of about 6 cables; Pluvier bank, awash at low water, is situated near the extreme, with a reef which dries 4 feet at half a mile north of it. Rocks uncovered at half tide lie off the north-east point, and sunken ledges off the south-east point.

Lat. 21° 14' N.  
Long. 107° 56 $\frac{1}{3}$ ' E.

A bank with from 3 $\frac{1}{2}$  to 5 fathoms extends 1 $\frac{1}{2}$  miles south-eastward from the south-east end of Lo shu shan island, with depths of 6 $\frac{1}{2}$  to 9 fathoms between it and Im shan.

**Anchorages.**—There is anchorage in about 6 fathoms, sand and mud, with tolerable shelter during the north-east monsoon, under the south-west side of the island, avoiding the patch of 4 $\frac{1}{2}$  fathoms situated about 2 cables off the shore.

**Im shan**, the centre island, lies 2 $\frac{1}{2}$  miles south-east of Lo shu shan. It is about one-third of a mile in extent, 207 feet in height, with an islet 148 feet in height near its west point. It is surrounded by foul ground to the distance of about 2 cables, and a reef which dries 8 feet lies 4 cables E. by S. of its south extreme. About 2 cables farther eastward is a group of rocks always above water, and which serve as a guard to the reef.

Lat. 21° 11 $\frac{1}{3}$ ' N.  
Long. 107° 50 $\frac{1}{3}$ ' E.

**Tai chan tao**, about 6 cables in extent, and 453 feet in height, lies about 3 cables southward of Im shan with a depth of 6 fathoms between.

General chart, 2,062 [2,708].

Charts, 1,965  
[2,708].  
776 [2,712].  
Var. 1 $\frac{1}{2}$  E.

Except for a short distance off its north-west side it is free from danger. West rock, 30 feet high, lies half a mile westward of it.

**Sam ha pai** is a reef about 2 cables in extent, with three heads dry at low water springs, the highest being then 3 feet above water. It lies N.E. by E.  $\frac{1}{2}$  E., distant  $5\frac{1}{2}$  miles from Pyramid rock on Lo shu shan.

Breakers have been seen one mile southward of the reef. The west extreme of Tai chan tao in line with or shut in with the east extreme of Im shan, leads westward of these dangers.

Lat. 21° 14' N.  
Long. 107° 41' E.

**KUA MO APPROACH.—Outlying shoals.**—Within the Kao Tao and Lo Shu shan islands is the Kuai Shin Mun, a channel nearly 2 miles wide, between Singes and Cigales islands, leading to Kua Mo the approach to Tien yen, and to Ko Kai Mun, the continuation of the inner route north-eastward.

A bank with less than 5 fathoms water extends  $5\frac{1}{2}$  miles seaward of Singes island and of the islands north-eastward of it, or for about half-way towards the off-lying islands. On this bank are numerous patches with depths of  $1\frac{1}{2}$  to 3 fathoms, one of which, with  $2\frac{1}{2}$  fathoms, situated about 7 miles E. by N.  $\frac{1}{2}$  N. of Singes island is named Clocheterie bank. A sand patch  $1\frac{1}{2}$  cables in extent, with a depth of  $1\frac{1}{2}$  fathoms, lies  $2\frac{1}{2}$  miles south-westward of Clocheterie bank, with the northern point of Singes island bearing S.  $83^{\circ}$  W., distant  $4\frac{7}{10}$  miles.

A patch of  $1\frac{1}{2}$  fathoms lies with the north extreme of Singes island bearing W.N.W., distant 4 miles. On a bank with less than 3 fathoms nearer the shore are patches of  $1\frac{1}{4}$  and 2 fathoms, lying with the north extreme of Singes island bearing N.  $24^{\circ}$  W., distant  $1\frac{9}{10}$  miles, and N.  $37^{\circ}$  W., distant  $2\frac{3}{10}$  miles, respectively.

The chart will afford the best information on the position of these shoals; others may exist.

**INSHORE CHANNEL.**—Northward of the Kua Mo are the long and high islands named Deux Chaines, Grand Singe, Chateau Renaud, and Tsieng Mui, within which is a smooth water channel during the north-east monsoon period for light draught vessels. The entrance is at Ko Kai Mun, from whence it is about 23 miles to the Kua Tam where vessels come out again. (See inshore channel from the Fai Tsi Long bay, page 489.)

\*Lat. 21° 14' N.  
Long. 107° 30' E.

**KUA MO and Tien Yen road.\***—Kua Mo is about half a mile wide between Verte island and the point of the peninsula forming its south point, with a depth of 9 to 10 fathoms, shoaling gradually within to 5 and 6 fathoms westward of Pirates island and in Tien Yen road. Abreast Pirates island the channel is but 2 cables wide, there being a

bank about one mile in length with depths of 5 to 9 feet, forming the north side of the fairway.

Charts, 1,965  
[2,708].  
776 [2,712].  
Var. 13° E.

**Directions.**—The Kua Mo is entered from seaward through the Kuai Shin Mun, the approach to which is over the bank before mentioned, in depths of about 3 fathoms at low water springs, and 5½ fathoms at high water springs, avoiding the patches of less water shown on the chart. The summit of Deux Chaines island in line with the north extreme of Singes island bearing about W. ¼ N., apparently leads in the best water, but this information is derived only from the chart. Round the north point of Singes island at the distance of about half a mile and steer direct for Kua Mo, southward of Verte island. The north side of Pirates island should be kept aboard; Verte island touching the north end of Pirates island leads between Pirates island and the Middle bank. When the south end of Pirates island bears East, steer West, anchoring in 5 to 6 fathoms sand and mud, when the island is distant nearly a mile.

There is not less water for 3 miles farther north-westward, in Tien Yen road; above this it is shallow and intricate.

**Coal dépôt.**—Southward of Pirates island is Port Wallut, mentioned on page 491, as the coal dépôt for the mines at Kebao. At the wharf in a cove here, will terminate the proposed railway from the mines.

Lat. 21° 12' N.  
Long. 107° 33' E.

A conical buoy marks the edge of the shoal water extending from the southern shore. Port Wallut is not recommended as an anchorage, as the tide runs strongly, and violent gusts of wind sweep through it.

**Tien Yen** is about 11 miles above Pirates island, and is apparently barely accessible for boats at low water; at spring tides, the streams run very strong, and are much increased during the rainy season. At the latter period the river is nothing but a torrent; in the dry season boats can scarcely ascend it, and they have to be dragged from one portion to another.

Lat. 21° 18' N.  
Long. 107° 24' E.

Tien Yen has a market offering a few supplies; above, the country is fertile and picturesque.

**LIGHTS.**—On Pagoda point pier, on the southern side of entrance to Tien Yen river, a *fixed red* light is exhibited from a pole on a grey shed, at an elevation of 23 feet above high water; it is visible in clear weather from a distance of 5 miles, when bearing from N. 58° E., through north and west, to S. 58° W.

Lat. 21° 17' N.  
Long. 107° 20' E.

A *fixed white* light is shown, from an iron pole with ball painted red, on the shoal extending from Pagoda point; it is situated 9 cables S. 65° E. from the preceding light, is elevated 10 feet above high water, and can be seen from a distance of 4 miles.

Charts, 1,965  
[2,708].  
776 [2,712].  
Lat. 21° 15' N.  
Long. 107° 33' E.  
Var. 1½° E.

**KOKAI MUN or Kua Van muk** is the continuation of the inshore channel north-eastward from the Kua Mo, or for vessels from the south-westward. It is about half a mile wide in the entrance with depths of 7 to 8 fathoms, but the approach from seaward has not more than 3 fathoms at low water.

A reef of rocks, always above water, lies  $2\frac{1}{2}$  cables south of the east point of entrance; the only known danger is a patch of 4 feet situated in the fairway,  $2\frac{1}{2}$  cables West of the bare island just within the north point of entrance.

**Directions.**—To enter, having passed northward of Singes island as for Kua Mo, steer for the west extreme of the island on the north side of entrance, bearing N. 42° W., in line with the left slope of a distant hill, until the south end of Cigales island is over the middle of the low rocks in the channel, which mark kept astern, leads southward of the 4-feet patch; thence course may be altered to the anchorage in 7 to 8 fathoms sand, or shaped northward for the inner passage.

Mirnidon hill over the centre of the eastern island of the Two Brothers leads westward of the 4-feet patch. If there is a strong southerly stream it is recommended to pass between the patch and the islet, by hauling close round the latter.

Lat. 21° 18' N.  
Long. 107° 41' E.

**Ho Lai Mun or Kua Tieu**, is the entrance to the inshore channel eastward of Ko Kai Mun, between Grande Singe and Chateau Renaud islands; it is about 2 cables wide with a depth of about 9 fathoms, but its approach is the same as for Ko Kai Mun and Kua Mo, over the bank with 3 fathoms. The only danger, is a rock which dries at low water between the island on the south side of the approach and the west part of the entrance, but it is well westward of the fairway. Within the entrance there is good anchorage.

Proceeding north-eastward, the best water, about 12 feet, is close to Chateau Renaud island; a rock which dries 5 feet lies 4 cables from that island at  $2\frac{1}{2}$  miles north-eastward of its west extreme.

Chinese Cap, 623 feet in height, is a conspicuous island on the bank fronting the mainland. Fishing stakes will be seen on these banks.

Lat. 21° 21' N.  
Long. 107° 48½' E.

**FU TAI MUN or Kua Dai** is the entrance between Chateau Renaud and Tsing Mui islands; it is about 7 cables wide, with good sheltered anchorage in depths of 5 to 10 fathoms over an area of a mile in extent within. The south-eastern point of entrance is 558 feet in height.

The entrance is barred like the other entrances, by a bank over which there is about  $3\frac{1}{2}$  fathoms at low water; springs rise about 16 feet.

**Dangers.**—Clocheterie bank, before mentioned, with  $2\frac{1}{2}$  fathoms, and patches of  $2\frac{1}{2}$  and 3 fathoms eastward of it, lie on the west side of the approach; a patch of  $2\frac{1}{2}$  fathoms lies on the east side of approach, 4 miles S. by E.  $\frac{1}{2}$  E. from the hill over the east point of entrance. Eastward of a line joining the hill and the last-mentioned patch the water is shallow, and also that between the hill and the inner east point of the entrance; a rock which dries 8 feet lies 2 cables south-east of the latter.

A bank with  $1\frac{1}{2}$  fathoms lies from a half to one mile southward of the west point of entrance.

A patch of  $3\frac{1}{2}$  fathoms lies near the fairway in the north end of the entrance, 3 cables from the west point.

**Directions.—Anchorage.**—The inner eastern point of the entrance bearing N. by W.  $\frac{1}{4}$  W. leads in over the bank fronting it, between the shallow banks, in about  $3\frac{1}{2}$  fathoms at low water; the approach, however, has not been closely sounded and other banks may possibly exist. The above mark should be steered for until within 4 cables of the point, when course should be altered to pass midway between it and the  $3\frac{1}{4}$ -fathoms patch in the fairway. From abreast the point steer for Mirmidon hill (a bare summit rising above the mangroves to the north-westward), anchoring as requisite. Small craft may go as far northward as Verte island, or beyond, in depths of 3 to 4 fathoms.

The channel eastward is close along Tsieng Mui island and has not less than  $3\frac{1}{2}$  fathoms if the fairway be kept, but it is more difficult to do so here than to the westward as it varies in its distance from the island; low water is the best time as the banks are more defined. The northern banks have numerous fishing stakes.

**Ak hoi**, on the mainland, is situated about 6 miles from the anchorage just mentioned. Fishing stakes line the channel to this place, but they are constantly displaced and a boat could only ascend to it with the assistance of a native.

Ak hoi is the most popular centre of the northern coast of Tong King; the inhabitants are principally Chinese; the most convenient place for landing is near the limekilns below the town. The freshets in the river are less violent than in the Tien Yen during and after the summer rains, but the large boulders covering its bed testify to the rapidity of the stream at that time.

**Tsieng Mui island** is the easternmost island of those forming the inshore channel; it is about 10 miles in length,  $1\frac{1}{2}$  miles in breadth, with a ridge of hills extending along its northern side for its whole length, attaining a height of 577 feet in Needle peak, distant  $2\frac{1}{2}$  miles from its eastern extreme. There are a few miserable villages on its eastern portion.

Charts, 1,965  
[2,708].  
776 [2,712].  
Lat.  $21^{\circ} 22' N.$ .  
Long.  $107^{\circ} 47' E.$ .  
Var.  $14^{\circ} E.$ .

Lat.  $21^{\circ} 22' N.$ .  
Long.  $107^{\circ} 47' E.$

Lat.  $21^{\circ} 27' N.$ .  
Long.  $107^{\circ} 44' E.$

Chart 776 [2,712].  
Lat. 21° 24' N.  
Long. 107° 59' E.  
Var. 14° E.

**Kua Tam** is the eastern entrance to the inshore channel; it is about 2 cables wide between the banks on either side, with a depth of  $3\frac{1}{2}$  fathoms, and there is about the same depth in the approach; the 5-fathoms line, however, is but one mile off shore.

**Directions.—Anchorage.**—Arequier rock, about 65 feet in height, situated about 2 cables off Tsing Mui tao, the west point of the entrance, is a good mark. It may be steered for bearing about North until within 3 or 4 cables of it, when course should be shaped to pass eastward of it at the distance of  $1\frac{1}{2}$  cables; haul to the westward as soon as within it, and give the point of the island a berth of 2 to 3 cables.

The swell penetrates a considerable distance during the north-east monsoon period and during the flood stream, rendering it advisable to anchor at about 2 miles within the entrance, where there are depths of 5 to 6 fathoms.

**Tides.**—Springs rise  $16\frac{1}{2}$  feet at the Kua Tam, see page 493.

Lat. 21° 26' N.  
Long. 107° 58' E.

**Monkai river** lies northward of the anchorage and westward of Tra Ko island; it can only be ascended by boat, with local knowledge; about 7 miles up is the village of the same name.

**Beacons.**—The fairway, leading to Monkai river from Arequier rock to Nui Ngok is marked by four pole beacons, two of which, with cylindrical top-marks, are painted black, and two with conical top-marks red. That part of the channel (the outer) marked by the black beacons is liable to change, under the influence of gales of wind and strong tides, when necessary the positions of the beacons are altered.

**COAST.—Tra Ko island.**—The coast within the Kua Tam is fronted by Tra Ko island, 7 miles in length by one mile in width, with a channel within it into which some of the mouths of Monkai river discharge. The south-west extreme of the island, named Nui Ngok, is 360 feet in height; towards the eastern end of the island is a Christian village and church. The whole coast, to cape Pak lung is fronted by a shallow bank extending out to a line joining the cape to Tsing Mui island.

Lat. 21° 28' N.  
Long. 105° 3' E.

**Chok shan river** enters the sea close eastward of Tra Ko island, between shallow banks marked by breakers, nearly 2 miles beyond the island. The channel is about a quarter of a mile wide between these banks; a little farther seaward is the bar, with a depth of 4 feet over it at low water springs and 20 feet at high water springs.

To enter, bring the tree just to the right of the summit of Chok shan hill in line with the mission church, bearing N.N.W., which leads over the bar and up the channel to abreast Tra Ko east point, whence the course is North for one mile, at which distance there is anchorage for small craft in 6 to 10 feet at low water. Boat channels lead to Monkai river, Oanh Xuan bay, &c.

## NORTH SHORE OF TONG KING GULF.

Var. 1° E.

**Tidal streams.**—In the northern part of Tong King gulf, the set of the stream during the day is easterly for 8 hours, and westerly for 16 hours throughout the year.

On full and change days in summer the E. set commences at 3h. p.m.

"	"	"	"	W.	"	11h. p.m.
"	"	"	winter	E.	"	3h. a.m.
"	"	"	"	W.	"	11h. a.m.

and occurring about one hour later every day.

The rate is from a half to  $1\frac{1}{2}$  knots an hour, being accelerated or retarded by the prevailing monsoon.

**CAPE PAK LUNG**, situated  $6\frac{1}{2}$  miles eastward of the Chok Lat.  $21^{\circ} 28' N.$  shan river entrance, is a prominent point 295 feet in height; the land Long.  $108^{\circ} 11' E.$  recedes sharply on both sides, that to the west forming Oanh Xuan bay.

Inland is a chain of mountains from 5,000 to 6,000 feet in height.

**Foul ground** extends half a mile off the cape, and for about 2 cables off its west extreme, with a patch of  $1\frac{1}{2}$  fathoms W.S.W. of that extreme as mentioned below.

**Pak lung rock or Pak son kong pai** is a rock which never Lat.  $21^{\circ} 23' N.$  covers, situated about 7 miles S.  $3^{\circ} W.$  from the cape; being low and so Long.  $108^{\circ} 10\frac{1}{4}' E.$  far from the cape, it renders the neighbourhood dangerous at night.

**Oanh Xuan bay.**—The entrance to this bay lies between banks of sand to the west, and the high land of cape Pak lung to the east. It extends to the north-eastward about 3 miles, and then opens out and forms a large bay, mostly dry at low water at the head of which the river Vai han long discharges. The bay affords secure anchorage for vessels of light or moderate draught in a depth of 5 to 6 fathoms, good holding ground.

The entrance is about half a mile wide between the foul ground extending from the cape and the banks to the westward; there is a patch of  $1\frac{1}{2}$  fathoms in the fairway. The bar, which extends nearly a mile seaward of the cape, has about  $4\frac{1}{2}$  fathoms at low water, and there are depths of 6 to 7 fathoms within over a length of about 2 miles by a quarter of a mile in breadth, with a further considerable space for vessels of light draught.

To enter, the extreme of the ledge off the cape should be previously buoyed unless a pilot is obtainable.

**Tiao Tan.**—The coast between cape Pak lung and Tiao Tan island, Lat.  $21^{\circ} 32' N.$  82 feet in height, at 14 miles to the eastward, is but little known; a patch Long.  $108^{\circ} 25' E.$  of  $2\frac{1}{2}$  fathoms is charted E. by S., distant 3 miles from the cape, near the edge of the 5-fathoms line. Between Tiao Tan and the islet, 26 feet in

Chart. 875 [2,707]. height, to the westward of it, the 5-fathoms line is about 3 miles off shore.  
Var. 1° E. Westward of this islet is a deep bay into which the Ngan Nan Kiang discharges, apparently encumbered with shallow banks.

**Long Mun river.**—Between Tiao Tan islet and Tui Mui tiao islet, 65 feet in height, a distance of 17 miles, lies the estuary of the Long Mun, about 10 miles wide and encumbered with numerous shallow banks with narrow channels between. Good and secure anchorage may be obtained about 12 miles above the bar, abreast and below Long Mun, in depths of 4 to 5 fathoms.

Lat. 21° 31' N.  
Long. 108° 32' E.

**Directions.—Bar.**—The western channel is the deepest and affords better marks, but it is not advisable to attempt the entrance without local knowledge or a plan of the place. The bar which has a low water depth of about 12 feet over a breadth of about half a mile, is situated 6½ miles E. ¼ S. from Tiao Tan islet; within it the water deepens. The mark for approaching it is Blot hill, 230 feet in height, on the western side of the bay, bearing N. 3° W.; when Tiao Tan bears N. 84° W. the vessel will be on the bar, whence course should be altered to N. 23° E., until the summit of Kai long shan, 508 feet in height, bears N. 2° W., open westward of Tai hom pai islet (15 feet in height) twice the breadth of the islet. This mark being steered for leads up the fairway, until Longue islet bears N. 11° W., which should then be steered for; and when Noire islet, 49 feet in height, bears N. 25° E., steer for it until the north end of Longue islet bears N.W. Then steer to pass about 3 cables westward of Noire islet, and when that island bears S. 41° E. astern, keeping it so will lead to the anchorage in 4 to 5 fathoms, which may be taken as convenient.

Lat. 21° 57' N.  
Long. 108° 36' E.

**Yam tiao.**—The town of Yam tiao is situated about 15 miles above Long Mun, on the river Yam tiao; it is only accessible by boats.

**Coast.**—From Tui Mui tiao the coast eastward forms a shallow bay into which the river on which Lein chau fu is situated, discharges in its north-eastern portion. Kwantau point is the eastern point of the bay within which is Pak hoi. The bay has a depth of less than 3 fathoms out to a line joining Tui Mui tiao to Kwantau point, and there is a patch of 3 fathoms at 8 miles West from the point, but within the 5-fathoms line.

Lat. 21° 27' N.  
Long. 109° 2' E.

**PAK HOI APPROACH.**—Kwantau point in the approach to Pak hoi, is prominent from the offing; it is remarkable as forming the western extreme of a low peninsula, being a range of hills nearly 1½ miles in length attaining a height of 374 feet, and from a distance appears as an island.

The western side of Kwantau peninsula is composed of cliffs from Chart. 875 [2,707]  
 60 to 70 feet high, whilst farther northward there are sand cliffs from Lat. 21° 27' N.  
 50 to 60 feet high and fronted by a bank with less than 6 feet water over Long. 109° 2' E.  
 it to nearly three-quarters of a mile. Var. 1° E.

**Off-lying shoals.**—There are depths of about 3 fathoms at a short distance westward and southward of the point, but to the eastward there is a bank with shallow water, which gradually increases its distance from the shore to 5 miles or more. A patch which dries at low water, named Pak fu tau sha, is charted on this bank, with Kwantau point bearing W.N.W. distant 10 miles; Ti sha shoal lies from 2 to 3 miles eastward of it and breaks at times. A shoal with  $1\frac{1}{2}$  fathoms on its south end and extending north-north-eastward about 2 miles, was reported in 1898, to lie with Kwantau point bearing N. 50° W., distant  $13\frac{1}{2}$  miles, and Guie chau summit S. 20° W. This coast should be given a wide berth.

Lat. 21° 17' N.  
 Long. 109° 14' E.

**Pak hoi anchorage**, situated in the eastern portion of the bay westward of Kwantau point, affords anchorage for vessels of moderate draught; it is sheltered from the sea during the north-east monsoon period, and is protected by sandbanks on its north side, but it is open to the south-west.

The channel is about a mile wide with depths of 3 to  $3\frac{1}{4}$  fathoms abreast Kwantau point, reduced to about half that width abreast Tikok, off which there is anchorage in 4 to 5 fathoms; above the fishing stakes which here stretch across the channel, there is anchorage in  $3\frac{1}{2}$  to 4 fathoms. The channel between the fishing stakes is generally about 90 yards wide, though the stakes are not always laid out in the same direction; its south side is marked by a red conical buoy with staff and cage, and the north side by a black buoy with staff and diamond. The striped buoy in the anchorage is in  $2\frac{1}{2}$  fathoms, within which the water shoals quickly.

**Directions.**—Access to Pak hoi anchorage is easy. Kwantau point may be approached on a N. by W. bearing until about a mile from it, when course should be shaped to give it a berth of about half a mile; from abreast the point course should be gradually altered to North, to round the bank extending off Nautilus hill and the sand cliffs; when Tikok bears E. by N., steer E.N.E. for the anchorage. If going to the inner anchorage, pass between the two buoys marking the passage through the fishing stakes, anchoring below the striped buoy unless of very light draught.

**Tides.**—It is high water, full and change, at 5h. 10m.; springs rise 16 feet, neaps 11 feet, approximately. The streams set through the anchorage at the rate of 2 knots at springs, and half a knot at neaps.

Charls. 875  
[2,707]. 876  
[2,713].  
Lat. 21° 29' N.  
Long. 109° 4' E.  
Var. 1° E.

**PAK HOI**, situated immediately under a low sand ridge on the south side of the anchorage, is a treaty port, opened in 1877. The town, formed of two long irregular streets, is unsanitary; it is said to have a population of about 25,000 inhabitants. There is apparently but little security for life or property here. The landing is good at high water.

A British Consul resides at Pak hoi.

Tikok to the westward of Pak hoi is a fishing village.

**Trade.**—The exports consist of indigo, hides, fish, pigs, raw silk, leather, tobacco, feathers, sugar, &c.; and the imports of Indian cotton yarn, shirtings, opium, metals, flour, rice, kerosene oil, woollens, matches, &c. The value of the exports in 1904 amounted to 160,763*l.*, and the imports to 271,024*l.* In the same year, 121 steam-vessels entered with an aggregate of 76,597 tons. In 1903, only one vessel, a tank oil steamer of 170 tons (which made two voyages) was British, though nearly all the trade is with Hong Kong; no British vessels entered in 1904.

**Communication.** — There is telegraphic connection with Hong Kong, and constant communication by steam trading vessels. A bi-monthly postal service is run from Kuang-tcheou and Hoi hau to Pak hoi by steam vessels proceeding on to Haifong.

**Supplies** of meat and vegetables are obtainable at moderate prices, cattle, pigs, and poultry, at a few days' notice; the water is unwholesome.

**Climate.—Winds.**—The rainy season at Pak hoi is from January to June, but it does not rain uninterruptedly or heavily; from January to April heavy northerly gales blow frequently and rise suddenly, lasting sometimes three days. Warning, however, of these gales will be given by the barometer rising, and the opposite coast becoming visible, which, under other circumstances, cannot be distinctly seen from Pak hoi.

Typhoons occur occasionally from June to October; their centres, however, are said always to pass south of Kwantau peninsula.

**COAST.**—At about 30 miles eastward of Kwantau point is a bay about 20 miles wide, the north-eastern head of Tong King gulf. It is encumbered with numerous shallow banks, between which is a shallow channel leading to Skek tau po\* and Shan han. This bay, as well as the western coast of Lei chau peninsula, has not been surveyed, and every care must be taken should it be found necessary to visit this locality. Mong tau point, about 25 miles northward of cape Kami, the north-west extreme of Hainan strait, is said to be foul to the distance of 5 or 6 miles.

**Nausa bay** lies southward of Ushek point, and has a river and a village of same name at its head.

\*Lat. 21° 36' N.  
Long. 109° 33' E.

Nausa point is low and shelving; a ledge extends about  $1\frac{1}{2}$  miles westward of it, the outer part of which is covered at high water.\* Charts, 875 [2,707], 876 [2,713].  
Lat.  $20^{\circ} 23' N.$   
Long.  $109^{\circ} 50' E.$   
Var.  $1^{\circ} E.$

**Carpenter range.**—The coast near Nausa bay is low and wooded, rising gradually to the Carpenter range, the summit of which is a flat hill, visible from near cape Kami in Hainan strait.

Approaching from the westward or north-westward, Carpenter range will first appear; the Shenwen range, 510 feet in height, will be seen some time before cape Kami comes in sight.

The coast southward is considered with Hainan strait, page 531.

**GUIE CHAU ISLAND**, situated about 23 miles southward from Kwantau point, is  $4\frac{1}{2}$  miles in length north-east and south-west, and 3 miles in breadth. The south and west sides of Guie chau are composed of hills rising abruptly from the water and sloping gradually to the north-east shore. Mount Humpel, the summit, 279 feet in height, is near the south-east extreme of the island, and has a small building on it, which makes an excellent mark.\* Lat.  $21^{\circ} 14' N.$   
Long.  $109^{\circ} 51' E.$

The west, north, and north-east sides of Guie chau have not been surveyed and should not be approached within 2 to 3 miles; and at night when in the vicinity of this island, do not shoal the water to less than 10 fathoms.

The gulf north-west of Guie chau is shallow, and many fixed fishing stakes may be seen in 7 fathoms, and deeper water. There is no reason to suspect shoal water on meeting with them, but irregular and shallow depths do exist eastward of a line drawn from Kwantau point to the west side of Lei chau peninsula.

Discoloured patches of small diameter, having an appearance of shoal water, are very common between Guie chau and Pak hoi. They are only detached mud whirls, or weed patches.

**Nam Wan (South harbour)**, situated on the south side of Guie chau, is about a mile in extent, with depths of 4 to 5 fathoms good holding ground, and sheltered from all winds except those between S.S.E. and E.S.E. Southerly winds, however, seldom blow home, and are never very strong.

The entrance of Nam Wan is  $1\frac{1}{2}$  miles wide; it is however, contracted to half a mile by a shoal of  $1\frac{1}{2}$  to 2 fathoms, which surrounds and extends half a mile in a south-easterly direction from Petit Cochon, a rocky islet 95 feet high, on the east side of the entrance. From the east entrance point a shoal of one to 2 fathoms extends 2 cables off; and from the west entrance point foul ground extends nearly half a mile in a south-easterly direction.

Chart, 875 [2,707]. On the beach at the head of Nam Wan there is a village, a short distance westward of which, and about half way up the cliff, stands a Chinese temple, conspicuous from its yellow colour against the dark back ground.

**Population.**—The population of Guie chau island in 1877 amounted to about 4,500, the principal occupation being the cultivation of sugar-cane and bananas.

**Supplies.**—Fish and fruit are plentiful, a few fowls also can be procured.

Lat.  $20^{\circ} 56' N.$   
Long.  $109^{\circ} 10' E.$  **Chai une island**, about 500 feet high, lies 6 miles south-east from Guie chau. It is a mile in length, and except from the eastward, shows a high bold cliff at its west extreme, above which is the summit. A village is situated in the valley in the middle of the island. Chai une affords no anchorage.

**Reported shoal.**—A shoal with a depth of 12 feet on it, reported by H.M.S. *Lily* to lie south-east from Chai une island, distant about 18 miles, was searched for unsuccessfully by H.M.S. *Magpie*, during the greater portion of two days. At 28 miles south-east of Chai une island, there are general depths of 7 to 8 fathoms, increasing towards the island, near which long streaks of weed and patches of discoloured water were seen, all of which had the appearance of shoal ground, but the soundings only indicated a gradual change of depth.

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General chart, 2,062 [2,706].

## CHAPTER XIV.

### HAINAN ISLAND AND STRAIT.

**HAINAN ISLAND.—General remarks.**—Hainan island, Chart 876 [2,718].  
bounding the Tong King gulf to the eastward, is about 155 miles in extent  
north-east and south-west, and about 90 miles in breadth.

Its southern half is high, attaining a height of 5,870 feet in the Great Ngchi range, whilst the northern portion is comparatively low. The mountains are covered with a dense vegetation, and in the plains are cultivated rice, sugar-cane, areca or betel-nut trees, and tobacco.

The island forms part of the province of Kwang tung, but the authority of the Chinese is not effective at any distance inland.

Kiung chau,\* the capital of Hainan, and its treaty port, Hoi Hau, are Lat. 20° 0' N.  
situated on and near the banks of a river on the north coast of the island. Long. 110° 21' E.

The south-east and south coasts of this island are generally bold to approach, but banks have been reported in places and others may exist. Off the west coast are several shallow banks, the farthest known of which is about 18 miles off South-west point.

The south coast is indented with several bays, affording good anchorage and shelter during the north-east monsoon period, but they are partly open to southerly winds; the north-west coast also affords good anchorage.

**Caution.**—The island, with the exception of the portion forming Hainan strait, has not been surveyed, consequently the position of a vessel is not to be accurately obtained by cross bearings.

**Population.**—The population is composed of two distinct classes of inhabitants; those in the interior are supposed to have originally come from Cochin China, and are constantly in arms defending their independence; whilst the coast population consists of a low class of Chinese who obtain their living by cultivating the soil, fishing, and by occasional acts of piracy. There are numerous fast sailing fishing-boats and junks belonging to the island; many of them go every year on fishing voyages, and navigate to seven or eight hundred miles from home, to collect the bêche de mer, and procure dry turtle and sharks' fins, which they find amongst the numerous shoals and sand-cays in the south-east part of the China sea. Their voyages commence in March, and they continue to fish until the early part of June, when they return, picking up their small parties left on various cays, and their collections.

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General charts, 2,062 [3,706] and 2,061a [2,680].

Chart, 876 [2,713]. The population of the island in 1896 was estimated to consist of 1,700,000 Chinese, 100,000 Sai and other tribes of the same origin, and 5,000 Miou, two races still independent.

Lat.  $20^{\circ} 0' N.$   
Long.  $110^{\circ} 21' E.$

**Climate.—Winds.**—The north-east monsoon in Hainan brings rain and is the cool period, but fogs are frequent; that of the south-west, on the contrary, brings a high temperature with almost daily squalls. The typhoon months are from June to October, those which occur in August and September being considered the worst.

The most agreeable months in Hainan are December and January, when the temperature is at its minimum, namely, about  $50^{\circ}$  at 6 a.m., and  $57^{\circ}$  at 2 p.m. In February it rises to about  $52^{\circ}$  and  $59^{\circ}$ , in March  $63^{\circ}$  and  $73^{\circ}$  at the same hours.

In April there is but little wind, and the temperature rises to  $82^{\circ}$ . May is very hot, and June scarcely bearable, the shade temperature reaching  $95^{\circ}$  and keeping up to  $82^{\circ}$  during the night. The records available do not go beyond this.

The following remarks are by Commander Carpenter, H.M.S. *Magpie*, when surveying Hainan strait in 1880:—

The average heat during the summer is not exceptionally high, but it is aggravated by the continual calms; the nights are cool. A thunder-storm usually occurs between one and 4 p.m., lasting from one to three hours, with occasionally a sharp squall. At the end of August and in September, westerly winds blow as often as easterly, but the former always brings rain or thick weather. During the winter months, easterly winds prevail. Sharp squalls lasting from 10 to 20 minutes are common in Hainan strait during the months of June and July, often blowing with a force of 6 to 8; the squalls are generally preceded by a blue haze or tint over the land, and are dangerous to boats under sail or with awnings spread.

The following shows the average direction and force of the wind from May to September.

May.—From South to S.E.; force 1 to 4. A short rain-squall nearly every afternoon.

June.—From South to S.E.; force 1 to 4. Rain-squalls as in May. A heavy gale from South, experienced on 28th June, force 10, lasted for 12 hours.

July.—From South to S.E.; force 1 to 4. Occasionally North-easterly and calm, the latter part of the month, Westerly 2 to 4. Rain-squalls less frequent. 17th July, a heavy gale from North continued for 12 hours, when it shifted to South and blew just as hard (force 9 to 10) for 12 hours.

August.—From South to West; force 1 to 4. Occasionally S.E., Chart. 1,019 [2,715].  
2 to 3. A few rain-squalls. 1st August, heavy gale as on 17th July. Var. N.  
August 31st, typhoon for 24 hours, force 11 to 12. Barometer, 28.83 ins.

September.—Variable North-easterly to South-easterly; force 1 to 4.  
Hardly any rain-squalls.

### SOUTH AND EAST COASTS.

**CAPE BASTION**, the south extreme of Hainan, and the south point of a high, bold, and rocky peninsula, is visible from a distance of 25 or 26 miles in clear weather. The water is deep at a short distance off it.

**GAALONG BAY**.—At  $3\frac{1}{2}$  miles eastward of cape Bastion is a black rocky point, named cape Rhinoceros, forming the west extreme of Gaalong bay, which is about 5 miles wide, and 3 miles deep. In the eastern part of the entrance are two round islands, 300 and 340 feet in height, named East and West Brother, and near the middle of the northern part of the bay lies St. Peter, or Middle island, 300 feet in height. Westward of St. Peter island there are three rocky islets, distant about three-quarters and  $1\frac{1}{2}$  miles. The bottom along the western side of the bay is said to be generally foul. A reef is reported to extend off the north-east extreme of the East Brother.

The usual anchorage is off Gaalong village, in Sampan bay, eastward of St. Peter island, in 7 to 8 fathoms water, over sand and mud. Here vessels are sheltered from all winds by the high land, except those between South and S.W., which force a considerable swell into the bay. A small vessel might moor close under the north side of St. Peter island in 4 to 5 fathoms, mud, and be sheltered from all winds; the depth is said to decrease to 3 fathoms half-way towards the north shore of the bay, and the bottom is sandy.

**Directions**.—The bay is but scantily sounded and should be entered with caution. The three channels are all said to be equally safe, guarding against the reef which is said to extend from the north-east point of the East Brother.

**Supplies**.—Small bullocks, fowls, and sweet potates are procurable at Gaalong village. Water is obtainable from the small stream northward of the anchorage. Firewood is abundant.

**LEONG SOI BAY**, eastward of Gaalong bay, is about 15 miles wide by 4 miles in depth, and open to the south-west monsoon. Leong soi point, its eastern extreme, is formed by several high hummocks having a sandy plain to the northward; a reef extends some distance off the point,

Chart, 1,019  
[2,715].  
Var.  $14^{\circ}$  E.

and a sunken rock, which breaks, is reported to exist near the shore at  $1\frac{1}{2}$  miles N.E.  $\frac{1}{2}$  N. of the point. The bay has several sandy beaches, and near its western shore are two islands, but they are too small to afford shelter for vessels anchoring between them and the coast; near them is the large village of Tong kin on a small stream.

\*Lat.  $18^{\circ} 22'$  N.  
Long.  $110^{\circ} 0'$  E.

At 2 miles westward of Leong soi point is another conspicuous point, with a hill of a sugar-loaf shape\*; and about 2 miles farther to the north-west are several dry rocks, steep-to, which extend three-quarters of a mile from another point. At  $1\frac{1}{2}$  miles N. by W. of this latter point is a narrow and very shoal passage, which leads between two sandy points into an extensive salt-water lagoon of an oval form extending north-eastward, but banks of coral and sand render its navigation difficult even for boats. There is a small fort on the west point of the entrance. The town of Leong soi, the residence of a mandarin, is 7 miles from the head of the lagoon.

Vessels will be sheltered in Leong soi bay during the north-east monsoon period by anchoring well in towards Table mount in about 10 or 12 fathoms, with the fort bearing N.E. by N. about 3 miles.

Water of good quality can be obtained from the point near the anchorage.

**Doubtful dangers** are charted at 6 miles and 12 miles S.E. of Leong soi point; the *Daniel J. Richard* is said to have touched on the inner one\* in 1872, and breakers were reported in 1890 at the other. Caution should be exercised when in this neighbourhood.

\*Lat.  $18^{\circ} 18'$  N.  
Long.  $110^{\circ} 8'$  E.

The COAST between Leong soi point and Malautau point, about 25 miles north-eastward, forms a large bay, in which may be seen many sandy beaches and high land near the shores, but it affords no safe anchorage during the southerly monsoon. In the vicinity of the coast near the middle part of the bay, are three prominent peaks of a range of mountains, the centre one being the most pointed, a little higher than the others and 2 miles from the shore. About 18 miles inland there is another mountain of similar appearance, but higher; it was seen from the eastward nearly 90 miles distant, forming three peaks. Malautau point, 820 feet in height, is the south extreme of a range of hills.

Lat.  $18^{\circ} 26'$  N.  
Long.  $110^{\circ} 8'$  E.

**Islands.—Tien Fung**, or Sail rock, bearing N.E.  $\frac{1}{2}$  E., distant  $5\frac{1}{2}$  miles from Leong soi point, is one of a cluster of large rocks above water, which, from its being higher and whiter than the others, with the appearance of a junk, has acquired the name of Sail rock. There is a depth of 14 fathoms between it and the shore, from which it is distant nearly 3 miles.

There are three small islands in the bay above mentioned, the western <sup>Chart, 1,019  
[2,715].</sup> of which, the Saddle, 338 feet in height, has two hummocks on it. The <sup>Lat. 18° 34' N.  
Long. 110° 11' E.  
Var. 1° E.</sup> eastern island, Namking chau, is 526 feet high, and the Middle island 260 feet in height. All three islands are about  $1\frac{1}{2}$  miles off shore, but they are too small to afford shelter from the sea.

About 5 miles south-west of Saddle island lies Hau tau wan inlet, but it is too shallow for an anchorage. About 2 miles N.N.W.  $\frac{1}{2}$  W. from Namking chau island is the entrance to Chue tau kong, which leads to the village of Shing lau and to the town of Mun chau; there are two remarkable rocks at the entrance of the lagoon, where there is a bar upon which the sea breaks.

**Fishing nets.**—In moderate weather, sailing along the coast, bamboos may frequently be seen standing erect above the surface of the sea; they are the buoys of drift nets, which the fishermen place sometimes a long distance from the land, to catch flying fish.

**Anchorages.**—There is anchorage, during the north-east monsoon only, off Nam hoi chun, at about 2 miles north-eastward of Namking chau, westward of Malautau point,\* in depths of, 6 to 9 fathoms, at from three-quarters of a mile to 2 miles off the sandy beach on the shore northward; also northward of Namking chau, in the bight westward of Chue tau, in 2 to 3 fathoms. <sup>\*Lat. 18° 39' N.  
Long. 110° 21' E.</sup>

**The COAST,** from Malautau point, trends  $12\frac{1}{2}$  miles north-eastward to Sifa or False point, showing a flat country faced with sand beach, with here and there hills rising like islands on the coast. Some of these hills project slightly seaward, and form shelter for junks during the north-east monsoon.

**TAI CHAU OR TINHOSA ISLAND,** is  $2\frac{1}{2}$  miles in extent in a north and south direction; it is formed by two hills united by a sandy isthmus, which partly covers at high water springs.

The hill charted on the southern portion is 797 feet in height, but it was formerly stated to be 1,083 feet; the hill on the northern part is charted as being 453 feet in height, but was formerly stated to be 609 feet; the greater elevations may be on those portions of the island which are not shown in detail on the plan. They are covered with thick foliage, chiefly pandanus and palmettos.

A sand bank, with  $3\frac{1}{2}$  to 5 fathoms water and possibly less, lies between a quarter and one mile south-west of the north-west extreme of the northern part of the island, and is about three-quarters of a mile in extent in a north and south direction.

Chart, 1,019  
[2,715].  
Var.  $1\frac{1}{4}^{\circ}$  E.

The channel between 'Tai chau and the coast, is about 3 miles wide, and the depth of water is stated to be from 9 to 14 fathoms westward of the sand bank mentioned.

**Water** and firewood can be obtained at Tai chau.

**Directions.—Anchorage.**—If coasting up under the lee of Hainan island from the westward during the north-east monsoon period, small powered steam vessels are recommended to pass midway between Namking island and the coast; after rounding Malautau point, stand over for the sandy isthmus of Tai chau, bearing N.E., and when within half a mile of it, steer to pass the north-west extreme of the island at the distance of a quarter of a mile, between it and the sand bank. (Apparently there would be much less risk in passing seaward of all the islands.)

Lat.  $18^{\circ} 43' N.$   
Long.  $110^{\circ} 26\frac{1}{4}' E.$

There is sheltered anchorage westward of the island in about 7 fathoms, at about a third of a mile off the isthmus, known as the West anchorage.

Tai chau island is of importance as an anchorage or refuge when the north-east monsoon is blowing strong, for small-powered steam vessels proceeding by this, the direct route from Singapore to Hong Kong. It affords a perfect lee, and with the exception of Chun Lan is the last anchorage, before a vessel leaves the shelter of the coast and steers out for Hong Kong. It must not, however, be used as a typhoon harbour, for it is open to the southward.

The anchorage off the east side of the peninsula will afford anchorage in the opposite season in a depth of 11 to 12 fathoms.

Lat.  $18^{\circ} 48\frac{1}{4}' N.$   
Long.  $110^{\circ} 32' E.$

**Sifa point**, 494 feet in height, lies 13 miles north-eastward of Malautau point, and has a sunken rock off it. The coast between is chiefly sandy beach, divided by two or three high rocky points; the southernmost, Baker hill, 390 feet high, has a pagoda on it.

**Round islet**, 340 feet high, lies 3 miles westward of Sifa point, and has a rock awash at low water at half a cable south-east of it.

**False Tinhosa**, is an islet 150 feet high, 2 miles north-eastward of Sifa point, and from a north or south bearing a pillar rock shows at its eastern extreme. A rock, 10 feet high, stands on the end of a ledge extending N.N.W. of False Tinhosa. There is little or no shelter under this island.

Lat.  $18^{\circ} 52' N.$   
Long.  $110^{\circ} 39\frac{1}{4}' E.$

A bank, the existence of which is doubtful, is charted E.N.E., about  $5\frac{1}{2}$  miles from False Tinhosa.

**The COAST** from Sifa point, abreast of False Tinhosa, trends in a north-easterly direction 57 miles, to Tonkon point, and is low; it is, however, marked by a conspicuous pagoda at Pak ngo, situated 20 miles north of Sifa point, and by another at Kachek, 10 miles north of Pak ngo, and nearly as far inland.

At about  $6\frac{1}{2}$  miles northward of Sifa point, and within a mile of the coast, are the Twin Black rocks, known also as the Jumeaux, 20 and 30 feet high. <sup>Chart, 1,019 [2,715]. Var. 1° E.</sup> Abreast them is a stream, with plantations of cocoanut trees. The country around is flat with hills here and there.

Northward of Pak ngo, to Tonkon point, the shore is lined with cocoanut groves, and is protected by a barrier reef 3 miles seaward, having passages through the reef opposite to fresh water streams on the coast. Junks work up inside the barrier in smooth water, calling at several small ports. The northern of these ports, named Fungka, is about 8 miles south-westward from Chun lan fort. Anchorage off Fungka may be obtained during the north-east monsoon in 4 fathoms, sand, under the lee of the reef, which here forms an elbow and joins the land.

The coral reefs are awash at half tide, having depths of from 5 to 6 fathoms water close outside them.

**CHUN LAN**, situated about 15 miles south-west from Tonkon point, is the only sheltered port between Yu lin kan and Nau chau, and is a capital typhoon harbour for such craft as can cross the bar, which has a depth of 9 feet at low water, with a spring rise of about 6 feet.

Lat.  $19^{\circ} 32' N.$   
Long.  $110^{\circ} 49' E.$

A vessel drawing 11 feet has entered at half-tide, when the banks were visible on either side.

Reefs, which break, extend from both points of the entrance to a distance of one mile seaward of the fort on the eastern side, leaving a channel to the river about a cable wide between them; a ridge of rocks, dry at low water, extends from the north-west entrance point nearly half-way across the mouth of the river.

The shore in the vicinity of the entrance is composed of a low sand reach with cocoanut trees extending almost to the water's edge.

**Directions.**—To enter, bring the fort to bear N.  $1^{\circ}$  E., as in view on plan, when distant about 2 miles, and steer for it on that bearing, until the first joss house to the eastward bears N.  $41^{\circ}$  E., when the vessel will be close to the shoalest part of the channel. Then shape a course N.  $6^{\circ}$  W. for the joss house up the river (the roof only of which is visible above the bank), which leads between the breakers on either side and within half a cable of the fort; following the bend of the river will then lead eastward of the rocks extending from the western shore. There is but 9 feet in the channel here at low water over a rocky bottom, the same depth as on the bar.

**Anchorage.**—There is a somewhat confined anchorage for a small vessel, in 3 fathoms, just inside Fort point. H.M.S. *Egeria* anchored off Chun lan river in a depth of 7 fathoms hard sand, with the fort on the

General chart, 2,062 [2,706].

Chart 876 [2,713]. east point of entrance to the river bearing N.W. by N., and mount Tonkon  
Var. 1° E. N.E.  $\frac{1}{2}$  E.

**Chun lan** is the headquarters of a considerable junk trade to Singapore and Siam. The people though quiet are not friendly (1894), and the natives should not be trusted as pilots.

Lat. 19° 40' N.  
Long. 111° 2' E.

**Tonkon point.—Mount Tonkon**, the summit of a range of hills 1,229 feet high, is a dark coloured mountain, from which a point with three or four hillocks stretches 2½ miles south-south-east to Tonkon point. A cluster of rocks above water, one of which is 15 feet high, extends half a mile from the point, southward of which is the barrier reef.

There is but little shelter under the point in a strong north-east monsoon, at which time the swell rolls in heavily along the whole line of shore; rocks just above water exist in the most sheltered portion, and the bay is encumbered with discoloured patches.

There are depths of 18 to 20 fathoms about 2½ miles from Tonkon point, on a foul bottom.

Lat. 19° 27' N.  
Long. 111° 1' E.

**Lorne rock**, on which the British steam vessel *Lorne* foundered in 1888 off the east coast of Hainan, after striking it, in the middle of the night, is a pinnacle rock with a depth of 6 feet at low water, situated with Chun lan fort bearing N. 71° W., distant 12½ miles, and mount Tonkon N. 4° W. The rock is 60 feet long in a N.N.E. and S.S.W. direction, and 15 feet wide; it is surrounded by depths of 30 fathoms.

**CAUTION.**—This coast has not been thoroughly surveyed; there are several reefs nearly 2 miles from the shore and others may exist. Vessels, therefore, proceeding along the land to avoid the strength of either monsoon, should exercise caution; and the use of the lead is enjoined. If standing northward, by night, Toukon point should be given a wide berth, as there is usually a set towards the shore.

**The COAST** from Tonkon point trends in a northerly direction 24 miles to Mofu point; northward of Tonkon point for some distance the shore is very low and sandy, beyond which it becomes again high.

Lat. 26° 1' N.  
Long. 110° 56' E.

**MOFU POINT**, the north-east extreme of Hainan island, when seen from the eastward, resembles Tonkon point. It is backed by a double-peaked black hill of the same name, 655 feet in height, and visible from a considerable distance in clear weather. The point is sandy, but its south side is bordered by a reef; shallow water encircles the point to a distance of about 2 miles, close beyond which there is a depth of 10 fathoms.

Owing to the prevailing thick weather during the north-east monsoon, Mofu point is frequently difficult to distinguish by vessels making it from the north-eastward; it may be recognised by a conspicuous conical tomb close to its extreme; also by the hills west of the point being of a reddish soil, whilst those to the southward are higher, and covered with black patches.

Charts, 876  
[2,713], 1,019  
[2,715].  
Var 1° E.

**The Coast** from Mofu point to the westward, forming the south side of Hainan strait, is referred to on page 530.

**The TAYA ISLANDS**, separated from Hainan island by a channel about 13 miles wide, with depths of 12 to 20 fathoms, consist of two groups of high, almost inaccessible, barren islands, seven in number, with some off-lying rocks.

The north-east group consists of four islands. North Taya island,\* Lat. 19° 59' N.  
Long. 111° 16' E. 648 feet high, the northernmost and largest, can be seen in clear weather from a distance of 28 to 30 miles. At half-a-mile southward of it is Perforated island, 375 feet high. A cone-shaped islet of the same height lies close off its south-west end. The south-westernmost island of this group lies 1½ miles from North Taya island and is 388 feet high.

The south-west group consists of three islands, the northernmost of which, 175 feet high, is very small. The middle and largest of this group, three-quarters of a mile from the northernmost island, has three peaks, the highest being 456 feet high; there is a rock off its north-east side. South Taya island,\* Lat. 19° 53' N.  
Long. 111° 13' E. 276 feet high, at 2½ miles from the northern-most of this group, makes as two islets from the northward and eastward.

The depths in the passage, 3½ miles wide between the two groups, range from 20 to 30 fathoms.

**Anchorage.**—Temporary anchorage may be obtained in 20 fathoms, mud, about one mile S.W. of North Taya island, but a swell rolls round the island during the north-east monsoon.

#### SOUTH AND WEST COASTS.

**YU LIN KAN BAY**, situated on the west side of cape Bastion (page 509), affords in the harbour at its head, the best anchorage on the southern coast of Hainan.

Lat. 18° 12' N.  
Long. 109° 34' E.  
Var. 1½° E.

The bay is separated from Sama bay to the westward by a long narrow strip of land, which terminates in Salomon point, between which and Tomb point, 147 feet high, is the entrance, 4½ miles wide. About one mile northward of Tomb point is Belier island, connected with the shore by a reef; a sunken rock lies off its north-west extreme.

Chart. 1,019

[2,715].

Var.  $1^{\circ}$  E.Lat.  $18^{\circ} 18' N.$ Long.  $109^{\circ} 34' E.$ 

The inner part of the bay offers good anchorage in the north-east monsoon period only, in depths of 6 to 7 fathoms, good holding ground, over a space of a mile or more in extent, with a sand and mud bottom mixed with broken shells. There is a spacious anchorage farther out, in 9 or 10 fathoms, on a mud and sand bottom, good holding ground, about three-quarters of a mile north-westward of Belier island, but the whole of the bay is exposed to the wind and swell during the south-west monsoon period. There appears to be no hidden dangers in the bay, excepting the small reefs that extend a short distance off the shores.

During the north-east monsoon the wind blows from E.N.E. across the bay, so that a sailing vessel can fetch into the inner harbour.

**The harbour** at the head of the bay is surrounded by hills, affords secure shelter at all seasons, and is available for vessels of moderate draught; the entrance, though narrow, has a low water depth of  $4\frac{3}{4}$  fathoms over a breadth of about half a cable; the depths within are from  $3\frac{1}{4}$  to 5 fathoms, but not over any great extent; the bottom is soft mud.

**Reefs.**—The east point of entrance is fronted by a rocky reef which extends more than a cable into the channel, and 2 cables to the north-west of the point; the west point has 4 fathoms within a short distance of it. Southward of the west point a reef extends about a cable from the shore, as far as Yu lin kan point.

The shores of the harbour are fringed by shallow banks to distances varying from one to  $2\frac{1}{2}$  cables; there is an isolated bank in the centre of the harbour, nearly dry at low water springs.

The harbour forms the outlet of a river which falls into its north-east part, towards which the depths decrease gradually.

**Directions.**—The best time to enter is at low water, the dangers being then more conspicuous. The peak, 86 feet in height, on the northern shore of the harbour bearing N.W. by N., leads through the entrance in  $4\frac{3}{4}$  fathoms water, at half a cable distant from the west point of the entrance; *see* view on plan. Haul to the westward round the west point and anchor as convenient.

**Tides.**—It is high water, full and change, at 9h. 5m.; maximum rise at springs about 6 feet.

**Supplies.**—Water is abundant near the cocoanut trees on the south-west side of the bay, westward of the entrance; beef and poultry are also obtainable there. The native dialect is not understood by the Cantonese.

**Cape Salomon** separates Yu lin kan bay from Sama bay; it is the extreme of a peninsula some 3 miles in length, attaining a height of 853 feet, and is connected with the mainland by a low isthmus.

**SAMA BAY**, situated westward of Salomon point, has several rocks and islets in it, with anchorage in Sama port for small vessels.

East island, 3 miles westward of the cape, is 207 feet in height, with a bank of  $4\frac{1}{2}$  fathoms at about one mile south-east of it.

West or Ponent island, 384 feet in height, lies 3 miles westward of East island, and is fairly wooded; a reef extends southward of it. There are some fishermen's huts on the north part of the island.

A reef with two rocky heads lies nearly midway and southward of a line joining the two islands; the passage between is not recommended.

**Sama port** affords anchorage during the north-east monsoon period in depths of 2 to 5 fathoms, and should be approached with the high rock on the south shore westward of the village bearing N.  $85^{\circ}$  E., to the required depth.

A river falls into the east part of the port, affording shelter to junks and boats. The town is the residence of a mandarin.

Some rocks above water form the north side of the port, distant about 4 cables from the south point of its entrance.

**GREAT CAPE**, situated 20 miles westward of Sama bay, is bold, and has a flat summit 1,740 feet high, with a slight saddle in it. A hill, having a pagoda on it, is situated about 5 miles eastward of the cape.

**Rock.**—A rock, which dries, lies S.W., distant  $3\frac{1}{2}$  miles from Great cape, with depths of 5 to 10 fathoms between.

**Horn mountain**, 3,160 feet high, about 12 miles north-east of Great cape, is conspicuous from the eastward, and has a nob on its summit. From the westward it has a rounded appearance.

**YAICHIU BAY**, between Great cape and Snake point, is exposed to southerly and south-westerly winds, but affords good anchorage during the north-east monsoon in  $3\frac{1}{2}$  fathoms, about 2 miles from the beach at the head; from this anchorage to the shore the water shoals gradually.

A good position for anchoring is with Yaichiu fort bearing N.N.E. and Mud islet in line with Button islet, bearing W.  $\frac{1}{4}$  S.

**Snake point**, has on its extreme two hummocks 90 feet high. The high land closes the shore at this point in one or two peaks, and then recedes and forms a background to the level plain of Yaichiu, which appears to be fertile and well watered, closing the coast again at Great cape.

Var. 14° E.  
Lat. 18° 22' N.  
Long. 109° 0' E.

**Islets.**—Off Snake point are two islets; Mud islet, 223 feet high, bearing South distant 2 miles, and Button or Siku islet, 256 feet high, S.W. distant 3 miles. Maddock rock, which dries, lies 2 cables N.E. of Button islet.

**Yaichu** is the principal port on the south coast of Hainan. At the entrance to the river is a bar with 7 feet water on it, within which is a good but small and shallow harbour.

A little way up the river, only navigable for boats in the rainy season, stands the town of Yaichu, with a citadel or fort to the westward. The country is fertile and well watered.

**Winds.**—Within 5 or 6 miles of this part of the coast, the North-east monsoon blows from N.E. to E.N.E. off Yu lin kan,

”	”	”	”	N.E. to S.E. off Great cape,
”	”	”	”	light and variable off Snake point,
”	”	”	”	North to N.N.W. off South-west point,
”	”	”	”	North to N. by E. off Shoal point, with a tendency to blow off the land at night.

**Reported dangers.**—Tide rips and eddies are very frequent in the neighbourhood of this coast, and their appearance has often been reported as shoals.

**THE COAST** from Snake point trends west-north-westward for 20 miles to South-west point. The low coast line forms a long bay, fronted with sandy hillocks from 20 to 40 feet high.

**Shallow sandbanks** are charted W. by S. 6 miles and W. by N. 10½ miles from Snake point, with other shallow banks nearer the shore; Great cape, open southward of Button islet, leads southward of these dangers.

Lat. 18° 17' N.  
Long. 108° 48' E.

**A patch** of 4½ fathoms, sand, reported in 1897, is charted W. by S. ¾ S., distant 10 miles from Button islet.

False hill, 400 feet, and Flat hill, 700 feet high, form a foreground near Three-tree anchorage, 2 miles south-east of South-west point.

**Three-tree anchorage** affords shelter in a depth of about 8 fathoms, sandy bottom, during the north-east monsoon period, but it is open to the wind and swell at the opposite season, and is then untenable. On the coast abreast is a white pagoda surrounded by trees. Owing to the increase of vegetation, the three trees which gave the name to the anchorage are no longer discernible.

Lat. 18° 31' N.  
Long. 108° 41' E.

**SOUTH-WEST POINT**, on which is situated Ying Khoa village, is bare and sandy, and the country is flat; but towards South-west hill foliage commences and cocoanut plantations are common.

General chart, 2,062 [3,706].

**Ying Khoa or Inkohai**, on South-west point, is a large fishing village built of stone. A reef fronts the village, and there are numerous fishing stakes extending a considerable distance off it. Lights are exhibited here for the use of the fishermen out at night. Var.  $1\frac{1}{2}$ ° E.

The people are not hospitable. Landing should be effected in native boats.

**South-west bank**, two patches, with about 3 feet water, is situated W. by S.  $\frac{1}{2}$  S., distant  $4\frac{1}{2}$  miles from South-west point, and is  $1\frac{1}{2}$  miles in length in a north-west and south east direction. It generally breaks, and is steep-to on its off-shore side, but it is connected by a shallow ridge to a shoal of one fathom, lying N.W. by W.  $\frac{1}{2}$  W. from it, distant  $3\frac{1}{2}$  miles. A patch of  $4\frac{1}{2}$  fathoms is charted W. by N.  $\frac{1}{2}$  N., distant 5 miles from the one-fathom patch.

**Outer bank**, of sand, lies W. by N.  $\frac{1}{2}$  N., about 18 miles off Lat.  $18^{\circ} 37' N.$  Long.  $108^{\circ} 23' E.$  South-west point, and is a dangerous, isolated shoal of about  $1\frac{1}{2}$  fathoms. It is steep-to both northward and southward, and breaks in a moderate swell, but would not show in smooth water.

Cometé bank is a patch of  $4\frac{1}{4}$  fathoms, situated about 2 miles northward of the centre of Outer bank.

There are many shoals in the bight between South-west point and Kam yan koh or Shoal point.

**Kam yan koh or Shoal point.**—From Ying Khoa village the coast trends in a general northerly direction to Kam yan koh, a distance of 22 miles; South-west hill, with a village on its south side, lies about midway between, near and northward of which are many trees, particularly the cocoanut. Near Kam yan koh sand again predominates; thence to Shin chim koh, which lies 11 miles northward, there is a long sandy plain, with occasional scrub and lagoons. Lat.  $18^{\circ} 53' N.$  Long.  $108^{\circ} 37' E$

Shallow water, named Kam yan sha, extends for several miles off Kam yan koh, with numerous tide-rips over and seaward of it. A patch of 3 feet is charted  $6\frac{1}{2}$  miles S.W. by S. of the point. Tan shin sha patches with depths of 3 and  $3\frac{1}{2}$  fathoms, are situated about 8 miles off-shore and 10 miles northward of South-west point.

**Directions.**—If steering to the north-westward, and desirous of visiting Ying Khoa village, steer in for mount Etna in line with the village bearing N.E.  $\frac{1}{2}$  N.; or if that mount is obscured, steer in with the east end of the village in line with Flat hill bearing N.E.  $\frac{1}{4}$  E.

False hill in line with the village leads on to South-west bank.

Deep water exists between South-west bank and Ying Khoa village, and it is probable there is a channel leading seaward from here, passing

Var. 14° E.

northward of Outer bank, but it has not been surveyed, and is, therefore, better avoided, more especially during the south-west monsoon period.

In navigating along the coast it would be prudent to keep outside a depth of 20 fathoms.

Lat. 18° 45' N.  
Long. 108° 53' E.

**MOUNTAIN RANGE.**—**Mount Etna**, 4,967 feet high, is a remarkable mountain and a capital landmark. It shows as a precipitous crater from south-east or north-westward, but viewed from the westward it appears as a single pinnacle. Between Pyramid point and the land a few miles to the southward, Mount Etna is not visible when within 15 miles of the coast, being hidden by mountains in the foreground. The mountain ranges are continuous from the vicinity of Tai chau island, on the south-east coast, round to South-west hill, which marks the extreme of the Etna range. Several fine valleys occur, notably at the head of Yu lin kan harbour, at Yaichu bay, and westward of Snake point. From South-west hill, northward as far as Hoita, the ranges lie far inland, and although they close the coast somewhat at that port, from there they turn away eastward, leaving only detached hills between them and the north coast.

**COAST.**—The coast northward of Kam yan koh is fronted by a shallow bank to 4 or 5 miles, but its limit is uncertain. A patch of 5 fathoms is charted 9 miles off shore about midway between the two points.

Lat. 18° 44' N.  
Long. 108° 57' E.

**Shinchim koh or Pyramid point**, the southern limit of Bakli bay, is a low flat sandy point having a steep rock 138 feet high on it.

A rock, 10 feet high, lies near the coast a few miles southward of Shinchim koh.

**Anchorage.**—Shinchim koh point affords some protection during the south-west monsoon for junks, the anchorage being in 3 fathoms, mud, 9 cables N.E. of the rock. A reef fringes the shore at a distance of 2 cables from high-water mark, and 3 fathoms will be obtained close up to it. The rock bearing southward of S.W. by S. clears the reef. Landing may be effected at about 6 cables eastward of the rock. The place offers no supplies, but it is the only anchorage for communicating with Bakli.

**Bakli bay**, with the village and a fort at its head, lies 5 miles north of Shimchim koh. A low sandy beach extends from the spit of Sikongsha or Si hu sa point, the north entrance point of the bay, to a reef abreast the village, where it terminates abreast a hillock, with depths of 2 fathoms at about 2 miles off it. The reef abreast the village covers

at high water, and extends about a cable off shore. The bay is not known Var.  $14^{\circ}$  E. to afford anchorage except under Pyramid point before mentioned.

**CHUN YAN BAY** is small and shallow, with a river discharging into it by several mouths. There is a walled town 4 miles south of Bluff point.

**Bluff point**, 120 feet high, is bold and rocky, with 8 fathoms Lat.  $19^{\circ} 21' N.$  water close to its north shoulder and 4 fathoms off the shoulder entering Chun yan bay. There is a high sand cliff on both faces, that on the south face falling abruptly into Chun yan bay. This declivity, kept on a bearing of N.E. by E.  $\frac{1}{2}$  E. will, allowing for the set of the tidal stream, lead between the northern and southern sandbanks off this coast.

**Banks.**—The extent of the northern bank is doubtful, and it seldom breaks, but the southern bank extends out from Sikongsha point about 5 miles, shows discoloured, and breaks in a fresh breeze.

There is probably shelter from the south-west monsoon immediately northward of Bluff point.

**HOITA.**—From Bluff point the coast trends north-eastward for Lat.  $19^{\circ} 28' N.$  15 miles to Hoita, commencing with a high sandy beach, and getting low and darker coloured towards the Saddle hills, which are 1,060 feet high. On both sides of Hoita the coast is foul. On the north side is a sunken reef about 3 miles in length three-quarters of a mile from the shore, and fairly steep-to.

The estuary of the river on which Hoita is situated is dry at low water, with the exception of a small portion in which one small vessel can lie when moored head and stern. The least water on the bar was 6 feet in 1880, the deepest water being on the village side, but it is subject to change, and the port could only be entered with local knowledge; springs rise about 9 feet.

The town is conspicuous with its white houses and junks at the anchorage; the Saddle hills are the best guide from any distance, they being the only isolated coast hills between Bluff point and Pingmar.

Hoita is the largest fishing station on the coast, and is the nearest port to the copper mines formerly worked by the Chinese. Water and an abundant supply of wood can be procured.

**Anchorage.**—There is anchorage off Hoita in a depth of 7 fathoms with the fort bearing E.S.E.

The coast from Hoita trends 7 miles north-eastward to Flat point, which is about 200 feet in height, whence it turns into Chappu bay.

**CHAPPU BAY** is large and open. Taichau reef, situated in the centre of the bay, is about 2 miles in length in a north-east and south-west

Var. 1° E.

direction, and has a sand cay 6 feet high upon it. The bay within the reef has an average depth of 5 fathoms, but a reef extends one mile south-west of Hiong Po point, and about the same distance from the south shore of the bay.

Lat. 19° 42' N.  
Long. 109° 10' E.

**Hiong Po harbour** is a well-sheltered harbour at the head of Chappu bay, and is available for vessels of moderate draught, there being a low-water depth of 14 to 17 feet over the bar, situated half a mile southward of the west point, with better water off Hiong Po. The entrance to Tam chau bay, the lagoon within Hiong Po, is 3 cables wide between the forts on either side, with a depth of 5 fathoms, within which there is shelter from all winds.

**Banks.**—The west side of the entrance is a narrow peninsula  $1\frac{1}{2}$  miles in length, and covered with groups of cocoanut trees, bamboos, &c., with a reef dry at low water about a mile to the westward, with which it is connected by a bank of sand; the eastern or harbour side of the peninsula is foul to the distance of a cable only. A sand bank, which dries 12 feet, near its north-west extreme where it borders the channel, extends  $1\frac{1}{2}$  miles from the southern fort, reducing the channel to the harbour to a width of about 2 cables. This bank affords excellent shelter to the anchorage in 5 to 6 fathoms off Hiong Po.

**Tides.**—The time of high water, full and change, is about 5 hrs., and the rise at springs 15 feet.

**Directions.**—Coming from the north-westward, mount Ungo, bearing S. 38° E., leads south-westward of the reef off the west point of the entrance. When mount Kung chin is seen midway between the forts at the entrance to the harbour, bearing N. 66° E., steer for it, which will lead over the bar in about 15 feet at low water. When mount Pingmar bears N. 33° E. (in line with the right part of a group of cocoanut trees), steer for it, passing midway between the western shore and the sand bank, to the anchorage off Hiong Po; or continue along the northern shore at a distance of about a cable to the anchorage in the lagoon within the forts; just within the forts there is a depth of 7 fathoms, but how far the deep water extends is not stated. The lagoon, however, is said to be encumbered with sand-banks.

The tidal streams run with considerable strength at springs, therefore towards low or high water would seem to be the best time to enter the harbour. It could not be entered without a plan, unless with local assistance.

**Hiong Po**, on the north side of the approach to the lagoon, is a fishing village. Many junks are anchored off here at times.

**Tam chau**, situated about 6 miles above the head of the lagoon Var. 1° E. or bay, is one of the most important places in Hainan; the people are reported to be hospitable.

**Cape Pillar**, the north entrance point of Chappu bay, is the Lat. 19° 47' N.  
Long. 109° 9' E. extremity of a range of red bare hills, and has a peculiar pillar rock on it. Two islets, named the Thumb and the Mandarin's cap, the latter 40 feet high, lie on the reef fronting the coast. A pagoda stands near the point. The reef off this point is steep-to.

**The Coast.**—From cape Pillar the coast is low and sandy, with cocoanut trees to Pingmar point, at the extreme of which is a pyramidal bluff, 50 feet high. A reef fronts it to the distance of about three-quarters of a mile for about 4 miles from cape Pillar; the remainder is apparently free from danger beyond a short distance.

**Landmarks.**—Approaching Hainan strait from the westward, the following hills form useful landmarks for ascertaining the position of a vessel; and on a nearer approach those mentioned on page 536.

**Pingmar point and mounts.**—Pingmar point is a steep coast cliff surmounted by a double hill. About 4 miles within the point are the mounts Pingmar, two conical peaks about a mile apart, and about 656 feet in height, capital landmarks\*; there is a pagoda on the highest, \*Lat. 10° 51' N.  
Long. 109° 17' E. but it cannot easily be made out.

**Kung chin.**—At 7 miles east-south-east of the Pingmar mounts, is the isolated crater-topped hill Kung chin, 683 feet high.

**Lamko hill**, 649 feet in height, about 20 miles eastward of the mounts Pingmar, has a summit somewhat flat with two little peaks.

**HAU SUI BAY** lies between Pingmar point and the point below Lamko hill, and is about 12 miles across.

**A reef**, dry at low water and about 4 miles in length, occupies the centre of the bay, and is steep-to on its north side; on its inner or south side is a sand cay, named Chung kwan yan, only a little above high water.

A coral patch, which dries about 6 feet, lies half a mile south of the islet. There is a patch which dries about 3 feet at 1½ miles west of the village of Hau sui.

**Anchorage.**—Good sheltered anchorage at all seasons may be obtained within the reef by small craft, in 4 fathoms, at half a mile S.W. of the islet. To enter the bay from the westward, steer in with Kung chin hill bearing S. by E. ¼ E. until Chung kwan yan bears East, when haul up, with the island a little on the port bow, anchoring as above. To enter from the eastward, steer in with Kung chin hill bearing S. 31° W.,

Chart 876 [2,718]. anchoring as requisite ; if wishing to anchor under the reef as before mentioned, haul to the westward when southward of the patch which dries, Lat.  $19^{\circ} 53' N.$  Long.  $109^{\circ} 27' E.$  situated southward of the sand islet, thence as requisite.

The village of Hau sui is on the east side of the bay at the entrance to the creek.

**Hau sui creek**, at the south-east extreme of the bay, has depths of 2 to 3 fathoms, with good shelter for junks and other light craft within. Sand banks extend a mile or more south-westward of the village and the south point of entrance, leaving only a narrow channel with a depth of about one foot at low water springs. A large number of junks use the creek and the anchorage outside.

#### HAINAN STRAIT.

**General remarks.**—Hainan strait, situated between the north coast of Hainan island and the south coast of Leichau peninsula, is about 50 miles in length east and west, and from 10 to 14 miles in breadth ; it has numerous sandbanks extending in a north-easterly direction for a distance of about 25 miles from its eastern entrance and a few isolated banks in its western entrance.

There are three entrances from the eastward, namely, the North, Middle, and South channels, all with deep water.

The South channel, or Inner passage, page 538, being near the shore, though narrow, is chiefly used ; it is buoyed, and should always be taken in thick weather.

Middle channel is strongly recommended in clear weather ; see page 537.

North channel is not recommended when coming from the eastward.

There is an inshore passage north-eastward to Nau chau available for vessels of light draught in charge of a pilot ; see page 533.

The western entrance is common to them all.

Lat.  $20^{\circ} 1' N.$   
Long.  $109^{\circ} 42' E.$

**SOUTH SHORE.—LAMKO POINT.**—From Hau sui bay eastward to Lamko point, a distance of about 11 miles, the coast is fronted by a reef with shallow water beyond to the distance of about 2 miles, and should not be approached within a depth of 10 fathoms.

Lamko point may be considered to be the south-west point of Hainan strait ; it is distant about 17 miles south-westward from cape Kami, which forms the north-west point of the strait.

Western cap, a hill 46 feet high, lies a mile south-east of Lamko point.

**LIGHT.**—From an iron tower on piles, 67 feet high, painted in red and white bands, situated about 250 yards within Lamko point, is exhibited,

at an elevation of 63 feet above high water, a *flashing white* light every <sup>Chart, 876 [2,713]</sup>  
*twenty seconds*, visible from a distance of 13 miles in clear weather.  
<sub>Var. 1° E.</sub>

**Coast.**—Eastward of Lamko point is a bay 6 miles wide, with depths of 7 to 8 fathoms in the entrance, shoaling gradually towards the shore. There is a harbour suitable for junks in its south-east corner with a small fort on the west point of the entrance.

**Maniu harbour** is situated about 8 miles eastward of Lamko point. <sup>Lat. 19° 58' N.  
Long. 109° 51' E.</sup> Its entrance between Hong pi kok islet and Sad point is  $3\frac{1}{2}$  miles wide, with depths of 5 to 7 fathoms, shoaling towards the shore; within Pao yu point it is very shallow. A small fort marks the head of the harbour, and near it is a creek, up which small junks find shelter. Eastward of Hong pi kok, the bottom is foul and shallow for the distance of one mile, and there is a patch of 5 fathoms between this foul ground and Sad point.

The land around and at the back of Maniu harbour is low and well cultivated.

**Anchorage.**—Good shelter will be found in Maniu harbour from easterly winds, in 4 fathoms, blue clay, with Sad point islet bearing N. by E.  $\frac{3}{4}$  E., and Pao yu point S.  $\frac{1}{4}$  E. There is also good anchorage in the western part of the harbour, in the same depth.

**Magpie point.**—From Sad point the coast trends eastward for about 3 miles in a line of red cliffs to Magpie point, rendered conspicuous by a detached piece of cliff 48 feet high off it. These cliffs, which are steep-to, range from 50 to 60 feet in height, and the black lava underlying the soil appears like a high-water mark. From Magpie point the coast trends south-eastward into Ching mae bay. <sup>Lat. 20° 0' N.  
Long. 109° 56' E.</sup>

**CHING MAE BAY**, lies between Magpie and Ching mae points. The head or south-west corner is marked by a hill 200 feet high, named Fah yung, which overlooks a lagoon that affords shelter to junks, and extends for some miles inland.

About 6 or 7 miles inland are two extinct craters, named the Hummocks, 564 and 705 feet in height, and visible about 25 miles in clear weather. Between Fah yung and the Hummocks stands Tong sui mun, a solitary hill, 470 feet high.

The land is low around this bay, rising gradually towards the Hummocks; the country is fertile and well cultivated; the beach is fringed with trees and bushes.

**Bank.**—Between Magpie and Tong sui points, in the south-west part of Ching mae bay, a sandbank, with as little as three-quarters of a fathom on it, extends for a distance of 4 miles east and west within the 3-fathoms line, leaving only a narrow channel between it and Magpie point.

Charts, 876  
[2,713].  
37 [2,714].  
Var. 1° E.

From Tong sui point, for a distance of 4 miles to the eastward, the shallow water extends a mile from the shore.

**Fishing stakes.**—There are several fishing villages in the eastern part of the bay, and the nets, some of which are floating and some fixed, barricade the shore for a considerable distance.

**Anchorage.**—Good anchorage may be obtained in the south corner of Ching mae bay, in a depth of about 4 fathoms, mud, about a mile N.N.W. of Shak ket long point; also at half a-mile south-west of the village near Ching mae point in 3½ fathoms, mud, passing in between the two sets of fishing stakes, where an opening is left for the trading junks.

Lat. 20° 4' N.  
Long. 110° 9½' E.

**Ching mae point**, the eastern limit of Ching mae bay, is low and sandy, with shallow water extending nearly a mile off it. The point is difficult to distinguish after dark as the hills stand so far back; it is better therefore to give it a wide berth in passing, and trust to making out vessels' lights for a guide into Hoi hau bay.

Fishing stakes extend from this point for a distance of about a mile.

**The town** of Ching mae is situated about 1½ miles from the coast and 5 miles southward of Ching mae point.

A village, built of black bricks or lava, is situated on the beach at about a mile south-west of the point, forming a conspicuous dark patch against the sand hills.

**Mandarin's cap**, a remarkable cone-shaped mound near the eastern part of Ching mae point, about half a mile from the beach, is a conspicuous object, and forms the west extreme of a range of sand hills from 70 to 80 feet high.

Lat. 20° 1' N.  
Long. 110° 10' E.

**HOI HAU BAY**, situated between Ching mae point and Baksha point, 8½ miles eastward of it, is nearly all shallow; depths of less than 3 fathoms extend three-quarters of a mile seaward of the line joining the points, in the western portion of which are situated Dale banks, with from 7 to 12 feet water at 1½ miles off shore. Banks of sand and mud with sand islets in places extend 1½ miles off the shore abreast Hoi hau.

**Aspect.**—The land in the neighbourhood of Hoi hau is low, and appears well wooded; midway between Ching mae point and Hoi hau there are some red cliffs with barren sand hills on the west, and wooded hills, 50 to 60 feet high, on the east side. An obelisk, with a fort near it, lies on the shore to the eastward of the wooded hills. There are two remarkable palms near Baksha village. Kiung chau pagoda, 154 feet high, forms a good landmark, but is not visible when bearing westward of South.

**LIGHT.**—From a cylindrical iron tower 22 feet high, painted white, Charts, 876 [2,713]. situated near the head of Hoi hau bay, is exhibited at an elevation of 37 [2,714]. 73 feet above high water, a *group-flashing white and red light*, with a period of *forty-five seconds*, visible from a distance of 10 miles in clear weather. The light shows as follows:—*White flash, one and a half seconds; eclipse, six seconds; white flash, one and a half seconds; eclipse, six seconds; white flash, one and a half seconds; eclipse, thirteen and a half seconds; red flash, one and a half seconds; eclipse, thirteen and a half seconds.*

The lighthouse itself is difficult to make out, as it stands in front of a low white building, which latter is easily seen. The white house bearing E. by S. 5 cables from the lighthouse is not discernible from the anchorage.

**Anchorage.—Directions.**—The anchorage in the eastern part of Hoi hau bay is partially protected by Baksha sand spit, especially for small craft and junks anchored well in towards the river, but it is open from N.E., round by north, to West.

Coming from the eastward, after rounding the fishing stakes off Baksha point, a course S.S.W.  $\frac{1}{8}$  W. for the Hummocks will lead to the anchorage; when Kiung chau pagoda bears S.E.  $\frac{1}{2}$  E. anchor in a depth of 4 fathoms. A heavy and confused sea gets up here at times, but the holding ground is said to be good, a mixture of mud and sand.

Vessels from the westward steer for Baksha point\* bearing southward \*Lat. 20° 53' N.  
Long. 110° 20 $\frac{1}{2}$ ' E. of East, until Kiung chau pagoda bears S.E.  $\frac{1}{2}$  E., when it should be steered for, anchoring when the Hummocks bear S.S.W.  $\frac{1}{8}$  W., as before.

Junks and other small craft usually anchor about  $1\frac{1}{2}$  miles farther in shore, in 8 to 10 feet, south-westward of the end of the sand spit.

Landing or embarking cargo is greatly impeded by the long mud-flats stretching off the town. The facilities for transhipment are not good, owing to the small size of the cargo-boats.

**Tides.**—It is high water, full and change, at Hoi hau at 7h.; springs rise from 6 to 10 feet. Time and height is very irregular.

The flood makes to the north-east for about 16 hours, the ebb to the south-west for about 8 hours; velocity  $1\frac{1}{2}$  or 2 knots an hour. In like manner the tidal stream through Hainan strait sets to the westward for 16 hours, to the eastward for about 8 hours; greatest strength 2 to 3 knots an hour. On the Hainan shore the stream is said to turn an hour earlier than in the offing. See pages 538 and 538A.

**Hoi hau river.**—The entrance of Hoi hau river is between two whitewashed forts. At low water the shallow flat-bottomed native boats cannot enter, but large junks are taken up for repairs at high tides. The river is not navigable beyond the town.

Charts. 876  
[2,713].  
37 [2,714].  
Lat. 20° 3' N.  
Long. 110° 20' E.  
Var. 1° E.

**HOI HAU** is the seaport and treaty port of the city of Kiung chau (the seat of Government in Hainan island and distant from its port about E. 3½ miles), which was opened to foreign trade in 1876. Vessels, on account of the shallowness of the bay and river, are compelled to anchor 3 miles from the town.

**Population.**—The town contains about 12,000 inhabitants and has a governor; the population of Kiung chau is about 35,000. Nearly all the European residences are converted Chinese houses.

A British consul resides here.

**Trade.**—The principal exports comprise pigs, sugar, grass cloth, betelnuts, seeds, sesamum, eggs, fish, and ground nut cakes; the imports consist of opium, rice, cotton yarn, shirtings, flour, kerosene, ginseng, Japanese matches, vermicelli, &c. The value of the exports in 1902 amounted to 284,295*l.*, and the imports to 440,065*l.* In the year 1902, 506 steam vessels entered the port, of 371,206 aggregate tonnage; of these 23 were British, 232 French, 198 German, and 46 Norwegian. No sailing vessels entered, junks excepted.

**Communication. — Telegraph.**—There are steam vessels running to Hong Kong and Pakhoi at intervals of a few days, and occasionally to Haifong, Tourane, Singapore, and Bangkok. A bi-monthly mail steamer runs between Haifong and Kwang chau wan, calling there and at Pakhoi both going and returning.

Hoi hau is connected by telegraph with Hong Kong and Haifong, by submarine cable laid from it to the mainland abreast.

**Supplies** are fairly plentiful, prices moderate; notice to procure them is required. Water is brought off in water boats, and reported (1903) to be of good quality.

**Coal.**—About 200 tons of Japanese coal for steaming purposes is usually kept in stock, and must be transhipped from lighters at the anchorage; about 400 tons are annually imported.

**Winds.**—Typhoons are said to be very severe in Hainan island. They occur from June to October, the worst being in August and September. Hoi hau is frequently visited by hard squalls, lasting only a few minutes, but with such force as to be very destructive to small craft.

**Temperature.**—During June at Hoi hau the temperature on the deck in the shade was 95° between noon and 3 p.m., and 83° at night, see page 508.

**Climate.**—As regards health, Hoi hau compares favourably with other parts of Hainan, though fever and ague prevail to some extent.

**Baksha or Hoi hau point,** is low and sandy, with occasional hillocks and patches of green scrub. The village of Baksha, a cluster of houses built of lava and black bricks, is situated about three-quarters of a mile back from the beach and about a mile southward of the point. Fishing stakes extend about 2 miles off Baksha point, into 8 and 9 fathoms water, at times.

Sand spits, which almost cover at high water, front the coast southwestward of the point, with shallow channels between, leading to Baksha and Hoi hau; these sand spits are subject to change during bad weather.

**Baksha banks** extend 9 miles in an E.N.E. direction from Baksha point; about midway a portion dries one foot at low spring tides. Nearly one mile within the east extreme of the banks there is but one foot of water; the western part may be crossed in 2½ fathoms at low water about 3 miles from Baksha point. Numerous fishing stakes are on the banks and in the bay within.

**POCHIN BAY** lies between Baksha and Pochin points, and affords good anchorage.

The coast from Baksha point to Pochin lagoon at the head of the bay, is low and sandy, intersected by creeks and backed by trees from 1½ to 2 miles inland; from the lagoon to Pochin point it is fronted by reefs, with small heads from 3 to 4 feet high.

**Pochin point** is composed of sand with a reef on which stands a rock 10 feet high.

**Pochin hill and pagoda.**—Pochin hill, situated 1½ miles within Pochin point, has seven peaks (but seldom more than four are visible at the same time), the highest of which, 459 feet high, has on it a pagoda.

**Anchorages.**—There is a good holding ground in a depth of 7½ fathoms, sand and mud, with Pochin point bearing East, distant 1½ miles. Also in 3 fathoms for small craft off Pochin lagoon, with Pochin point bearing N.E. distant 3 miles; but these are not at all protected from northerly winds, and consequently a sea soon gets up.

The best anchorage is in Kiung chau road, which lies southward of the Baksha banks, in about 4½ fathoms, stiff mud, with Pochin pagoda bearing E. ¼ N. and Kiung chau pagoda S.W. H.M.S. *Magpie* rode out a typhoon at this anchorage, being protected by the banks.

**Pochin lagoon and village.**—Pochin lagoon is fronted by a bar to the distance of 1½ miles, nearly dry all over at low water, and with about 10 feet at high water, at which time it is available for junks and other light craft. Abreast the village, within the fort on the east side, there is a

General chart, 2,062 [2,706].

E 82369.

L L

Charts, 876  
[2,715],  
37 [2,714].  
Lat. 20° 3' N.  
Long. 110° 20' E.  
Var. 1° E.

**HOI HAU** is the seaport and treaty port of the city of Kiung chau (the seat of Government in Hainan island and distant from its port about 3½ miles), which was opened to foreign trade in 1876. Vessels, on account of the shallowness of the bay and river, are compelled to anchor 3 miles from the town.

**Population.**—The town contains about 12,000 inhabitants and has a governor; the population of Kiung chau is about 35,000. Nearly all the European residences are converted Chinese houses.

A British consul resides here.

**Trade.**—The principal exports comprise pigs, sugar, grass cloth, betelnuts, seeds, sesamum, eggs, fish, and ground nut cakes; the imports consist of opium, rice, cotton yarn, shirtings, flour, kerosene, ginseng, Japanese matches, vermicelli, &c. The value of the exports in 1902 amounted to 284,295*l.*, and the imports to 440,065*l.* In the year 1902, 506 steam vessels entered the port, of 371,206 aggregate tonnage; of these 23 were British, 232 French, 198 German, and 46 Norwegian. No sailing vessels entered, junks excepted.

**Communication. — Telegraph.**—There are steam vessels running to Hong Kong and Pakhoi at intervals of a few days, and occasionally to Haifong, Tourane, Singapore, and Bangkok. A bi-monthly mail steamer runs between Haifong and Kwang chau wan, calling there and at Pakhoi both going and returning.

Hoi hau is connected by telegraph with Hong Kong and Haifong, by submarine cable laid from it to the mainland abreast.

**Supplies** are fairly plentiful, prices moderate; notice to procure them is required. Water is brought off in water boats, and reported (1903) to be of good quality.

**Coal.**—About 200 tons of Japanese coal for steaming purposes is usually kept in stock, and must be transhipped from lighters at the anchorage; about 400 tons are annually imported.

**Winds.**—Typhoons are said to be very severe in Hainan island. They occur from June to October, the worst being in August and September. Hoi hau is frequently visited by hard squalls, lasting only a few minutes, but with such force as to be very destructive to small craft.

**Temperature.**—During June at Hoi hau the temperature on the deck in the shade was 95° between noon and 3 p.m., and 83° at night, see page 508.

**Climate.**—As regards health, Hoi hau compares favourably with other parts of Hainan, though fever and ague prevail to some extent.

**Baksha or Hoi hau point**, is low and sandy, with occasional hillocks and patches of green scrub. The village of Baksha, a cluster of houses built of lava and black bricks, is situated about three-quarters of a mile back from the beach and about a mile southward of the point. Fishing stakes extend about 2 miles off Baksha point, into 8 and 9 fathoms water, at times.

Sand spits, which almost cover at high water, front the coast southwestward of the point, with shallow channels between, leading to Baksha and Hoi hau; these sand spits are subject to change during bad weather.

**Baksha banks** extend 9 miles in an E.N.E. direction from Baksha point; about midway a portion dries one foot at low spring tides. Nearly one mile within the east extreme of the banks there is but one foot of water; the western part may be crossed in  $2\frac{1}{2}$  fathoms at low water about 3 miles from Baksha point. Numerous fishing stakes are on the banks and in the bay within.

**POCHIN BAY** lies between Baksha and Pochin points, and affords good anchorage.

The coast from Baksha point to Pochin lagoon at the head of the bay, is low and sandy, intersected by creeks and backed by trees from  $1\frac{1}{2}$  to 2 miles inland; from the lagoon to Pochin point it is fronted by reefs, with small heads from 3 to 4 feet high.

**Pochin point** is composed of sand with a reef on which stands a rock 10 feet high.

**Pochin hill and pagoda.**—Pochin hill, situated  $1\frac{1}{2}$  miles within Pochin point, has seven peaks (but seldom more than four are visible at the same time), the highest of which, 459 feet high, has on it a pagoda.

**Anchorages.**—There is a good holding ground in a depth of  $7\frac{1}{2}$  fathoms, sand and mud, with Pochin point bearing East, distant  $1\frac{1}{2}$  miles. Also in 3 fathoms for small craft off Pochin lagoon, with Pochin point bearing N.E. distant 3 miles; but these are not at all protected from northerly winds, and consequently a sea soon gets up.

The best anchorage is in Kiung chau road, which lies southward of the Baksha banks, in about  $4\frac{1}{2}$  fathoms, stiff mud, with Pochin pagoda bearing E.  $\frac{1}{2}$  N. and Kiung chau pagoda S.W. H.M.S. *Magpie* rode out a typhoon at this anchorage, being protected by the banks.

**Pochin lagoon and village.**—Pochin lagoon is fronted by a bar to the distance of  $1\frac{1}{2}$  miles, nearly dry all over at low water, and with about 10 feet at high water, at which time it is available for junks and other light craft. Abreast the village, within the fort on the east side, there is a

General chart, 2,062 [2,706].

E 82369.

L L

Chart 876 [2,713]. low water depth of about 3 fathoms, decreasing again in the lagoon. The Var. 1° E. large trading junks from Singapore and China lie here waiting the change of the monsoon, or during typhoon weather. The village of Pochin is small and unimportant.

**Hainan bay.**—The coast from Pochin point curves gradually north-eastward to Haivan head, with Hainan bay between, which affords anchorage in a depth of 7 fathoms at about a mile south-west of the Bluff. At one-third of a mile westward of Hainan bluff is a rock 7 feet high, and another rock, 2 feet high, at about the same distance northward of it. The bay is foul to the distance of three-quarters of a mile off shore with rocks above water in places.

The shore of the bay is sand, backed by sand hills from 50 to 70 feet high and covered with scrub, with a tree here and there.

Lat. 20° 12' N.  
Long. 110° 37 $\frac{1}{4}$ ' E.

**Little Bank.**—To the northward of Hainan bay lies Little Bank, on the west side of Hainan head. Within a depth of 5 fathoms it is about 2 miles in length in an east and west direction. Near its west end is a patch of 1 $\frac{3}{4}$  fathoms, and at its east extreme one of 3 fathoms, with Hainan bluff bearing S.E.  $\frac{4}{5}$  S. distant 3 $\frac{1}{4}$  miles.

Plan on Chart,  
876 [2,713].  
Lat. 20° 10' N.  
Long. 110° 41 $\frac{1}{4}$ ' E.

**HAINAN HEAD and Inner Passage.**—Hainan head, the north extreme of Hainan island, is composed chiefly of sand, and attains a height of about 180 feet at one mile from the point; it is covered with short scrub, almost to the water, which continues for about one mile to the south-east, where all vegetation ceases, except a few isolated green patches. Hainan bluff, its north-west extreme, is a flat-topped mound, 173 feet high.

**Dangers.**—A reef, dry 4 feet at low water at its extreme, extends half a mile north of Hainan point. Magpie rock, a pinnacle, with 3 feet over it at low water, lies 1 $\frac{1}{2}$  miles S.E.  $\frac{1}{2}$  S. from Hainan point, and half a mile from the shore; detached rocks skirt the shore at half a mile distant for 1 $\frac{1}{2}$  miles in a south-easterly direction from the point.

Lat. 20° 8 $\frac{1}{2}$ ' N.  
Long. 110° 42 $\frac{1}{4}$ ' E.

Riversdale patch, of 2 $\frac{1}{2}$  fathoms, lies 4 cables N.E. of Magpie rock. A bank 2 $\frac{1}{2}$  miles in length, with a least depth of 1 $\frac{3}{4}$  fathoms, lies south-eastward of Magpie rock. Its shallow south-east extreme is about 2 miles off shore, and has depths of 2 $\frac{1}{2}$  fathoms; at 2 $\frac{1}{2}$  miles the depth is 5 fathoms.

The sandy point, 89 feet high, situated 8 miles south-eastward of Hainan point, is fronted by a reef to the distance of a mile with foul ground a mile beyond it. Eastward of this point is a sandy bay, beyond which the coast is fronted by reef and foul ground to Mofu point, decreasing to one mile off the point. (For Mofu point and coast southward see page 514.)

General chart, 2,062 [2,706].

The preceding dangers form the western and southern sides of Inner Passage and South channel.

**Hainan head bank** forms the eastern side of Inner Passage. It is about  $5\frac{1}{2}$  miles in length in an E.S.E. and W.N.W. direction, with a portion dry 3 feet\* at low water springs 2 miles from its west end, that extreme,  $1\frac{3}{4}$  fathoms, being situated about a mile E.N.E. of Hainan point. \*Lat.  $20^{\circ} 9' N.$   
Long.  $110^{\circ} 44' E.$

**A patch** of 2 fathoms, hard sand, was reported by the *Hanoi* in 1896, to exist on the south side of the bank, distant  $1\frac{6}{10}$  miles East of Magpie rock, or with Hainan point bearing N.W. by W.  $\frac{7}{8}$  W., distant  $2\frac{8}{10}$  miles.

**Buoys.**—A black buoy, with ball, marks the reef extending northwards off Hainau point, in about 10 fathoms water. A black buoy, with triangle, marks the north side of Riversdale patch situated north-eastward of Magpie rock. A red buoy, with an inverted cone, is moored 3 cables westward of the  $1\frac{3}{4}$ -fathoms patch on the west end of Hainan head bank, and lies with Hainan point bearing S.W. by W. distant 7 cables. These buoys are seen to every three or four months, but are not to be altogether relied on.

**Directions.**—See page 538.

**Anchorage.**—At 5 miles south-eastward from Hainan point there is anchorage in a depth of 8 fathoms, sand, at the distance of 2 miles off shore, which is slightly protected by Hainan head bank.

**Tides.**—It is high water, full and change, at Hainan bluff, at 10h. 35m.; springs rise 6 feet, neaps 4 feet. There are two high and two low tides in the 24 hours which are regular at full and change, but not so near the neaps. The flood stream generally runs for about 12 hours, as also does the ebb stream (there being hardly any slack water); the latter commences between the fifth and sixth hour after high water by the shore. The velocity is from 4 to 5 knots at springs off the bluff; see tidal streams, pages 538 to 539.

**NORTH SHORE.—Lei Chau peninsula** (*continued from* Lat.  $20^{\circ} 18' N.$   
*page 505).*—**Tong Chong, or Safe bay**, lies on the west side of Long.  $109^{\circ} 53' E.$  Lei Chan peninsula, northward of cape Kami. It is about 5 miles in length, fronted by reef and shallow water to the distance of about half a mile, and with a depth of 5 fathoms, mud, from one to  $1\frac{1}{2}$  miles off shore. The bay affords shelter with winds from N.W., round by north and east, to about South. There is an islet with a few trees, near the north-west point of the bay, and a few villages to the eastward of it. The coast between Tong Chong bay and cape Kami is level and cultivated, with a sandy beach and a few clusters of trees.

Chart 876 [2,713].  
Var. 1° E.

**CAPE KAMI.**—The north-west point of entrance to Hainan strait, is the south-west extreme of a sand islet about 40 feet in height, situated about half a mile within the edge of the reef which extends about 1½ miles south-west of the mainland.

Lat. 20° 13' N.  
Long. 109° 55' E.

**LIGHT.**—From an iron tower, on piles, painted white, erected about 80 yards from the extreme of cape Kami, is exhibited, at an elevation of 67 feet above high water, a *group-flashing white* light showing *two flashes* in quick succession every *thirty seconds*, and visible from a distance of 13 miles in clear weather.

The dwellings near the lighthouse are also white.

**A rock**, with 6 feet water over it at low springs and 2 fathoms around, lies S. by W. ¼ W. distant one mile from cape Kami, and a patch of 3 fathoms lies about one mile W.S.W. of the cape. There are considerable overfalls for some distance outside the rock.

A bank with 4½ fathoms lies S.E., distant 2½ miles from cape Kami.

For banks in the approach, see page 535.

**Anchorage.**—Good anchorage may be obtained, with shelter from north-west winds, in a depth of 5 fathoms, mud, with cape Kami bearing W. ½ N., distant 1½ miles ; and from north-east winds, in 9 fathoms, mud, with cape Kami bearing S.E. ¾ E., distant 1½ miles. In the typhoon season, safer anchorage will be found in Tong Chong bay.

**Tides.**—It is high water, full and change, at cape Kami, at 2h. 45m.; springs rise 9½ feet, neaps rise 7 feet. They are single day tides, one high water only in 24 hours, and regular except at neaps; see also pages 538 and 539.

**Kami bay**, situated east of cape Kami, is 11 miles wide, fringed by reef to about a mile off shore, and is shallow, the 3-fathoms line being at an average distance of 3 miles from the shore; it presents no features of interest. The eastern part rises gradually to the Shenwen range, but the western part is low, consisting of sand hills topped with bush, which become bare as cape Kami is approached.

**Islet point** is the eastern limit of Kami bay, off which there are several islets; shallow patches, with as little as one foot water, extend for a distance of 2 miles S.W. by W. of the fort on Islet point.

Lat. 20° 12' N.  
Long. 110° 5' E.

**Three-fathoms patch.**—The outer danger off Islet point is the Three-fathoms patch, situated S.W., distant 3 miles from Islet point fort, and E. ½ S., distant 9½ miles from cape Kami. There are heavy overfalls in the vicinity of this bank, and vessels should not attempt to pass inside of it.

General chart, 2,062 [2,706].

**Palm point.**—From Islet point, the coast trends eastward  $3\frac{1}{4}$  miles Chart. 870 [2,713].  
Lat.  $20^{\circ} 20' N.$   
Long.  $110^{\circ} 1' E.$  to Palm point, the west extreme of Hai an bay, rendered conspicuous by several trees; shallow water extends off the point for a distance of half a mile.

**Shenwen range,** about 3 miles in length in an east and west direction, attains a height of 510 feet and is conspicuous from the westward. South-eastward of it is Shenwen pagoda 385 feet about the sea.

**HAI AN BAY** lies between Palm point and an islet 4 feet high 6 miles to the eastward, within which is a conical mound 80 feet high,\* Lat.  $20^{\circ} 15' N.$   
Long.  $110^{\circ} 17' E.$  readily distinguished. The islet stands on a reef connected with the shore, and which extends about  $1\frac{1}{2}$  cables southward of it. The bay is shallow, the one-fathom line extending  $1\frac{1}{2}$  miles from the shore and nearly straight between the entrance points, affording little shelter except from northerly winds. Hai an village lies near the centre of the bay, with an inlet north of it. Baksha village is situated in a white sandy bay, nearly 3 miles east of Hai an.

**Hongham bay.**—From Hai an bay to Hongham bay, situated 6 miles north-eastward, the coast is formed of sandhills surmounted by patches of scrub.

**Anchorages.**—There are two good anchorages during northerly winds on the north side of the strait: in Hai an bay, with the White fort at Hai an bearing N.N.W. distant  $1\frac{1}{2}$  miles, in a depth of 5 fathoms, mud; and in Hongham bay,\* with the east point of that bay bearing Lat.  $20^{\circ} 17' N.$   
Long.  $110^{\circ} 23' E.$  E.N.E., distant  $1\frac{1}{2}$  miles in 7 fathoms, mud.

**INSHORE PASSAGE northward. — Directions.**—North-eastward of Hongham bay, along the coast, is an inshore passage called the Malu Hau channel leading to Nau chau island, available at high water, with local knowledge, for vessels of about 12 feet draught; *see tides, page 542.* A pilot is probably obtainable at Hoi Hau, or at Tamsui, on the south-west end of Nau chau, though too much reliance should not be placed in him.

The entrance from the southward is between Sheldrake island and Lei Chau peninsula, thence close eastward of Black rocks situated northward of Gopai point. The chart affords but little guide as the channel has not been surveyed. Northward of Gopai narrows the channel is over sand flats which have as little as three-quarters of a fathom at low water springs, or about 16 feet at high water springs. The channel is very narrow, apparently, when Malu Hau bears W.S.W., and the banks are numerous. Mount Kam Lung, 900 feet in height, on the peninsula, Lat.  $20^{\circ} 44' N.$   
Long.  $110^{\circ} 15' E.$  may be useful in checking the position of the vessel.

Charts, 876  
[2,713].  
3,349 [2,650].  
Var. 1° E.

Anchorage may be taken about a mile eastward of the Black rocks, in about 6 fathoms, if waiting for the tide. On approaching Nau chau island, with the lighthouse bearing N.  $\frac{1}{2}$  W., distant about 7 miles, a vessel will be in the Passe de la Surprise, and may steer N.W. for Nau chau passage; *see page 542.*

**Mound and Gopai points.**—Mound point lies about  $2\frac{1}{2}$  miles south-westward of Gopai point, the east extreme of Lei chau peninsula.  
 Lat.  $20^{\circ} 26' N.$   
 Long.  $110^{\circ} 30' E.$  The mound on it is 160 feet in height,\* pyramidal, of a dark colour, and stands above a steep cliff which is only seen from the southward. For 3 or 4 miles southward of this point foul ground extends  $2\frac{1}{2}$  miles from the shore; between this and Hougham bay the coast has not been examined.

**Sheldrake island**, about 7 feet in height, is a sand cay, situated about 6 miles south-eastward of Mound and Gopai points; this cay or bank is charted as being about 5 miles in extent, with shallow water extending some 2 miles southward of it, and 11 miles or more north-eastward.

Lat.  $20^{\circ} 29' N.$   
Long.  $110^{\circ} 33' E.$

**Black rocks**, a group about a mile in extent are situated about  $1\frac{1}{2}$  miles north-eastward of Gopai point; one of them is 4 feet high. Eastward of these rocks, about 2 miles, is a line of breakers extending north and south, the latter extreme being 3 miles S.E. by S. of Black rocks. The inshore passage, here called Gopai narrows, lies between the rocks and the breakers.

**Malu Hau** is a port on the east side of Lei chau peninsula, protected by a bar with only 4 feet on it at low water spring tides. It has a good trade in sugar and oil. To the eastward of Malu Hau are the extensive flats which obstruct the channel to Nau chau. The coast northward to Nau chau has not been surveyed.

**Tides.**—In the Malu Hau channel the flood sets northward and the ebb southward, but off the entrance to the Malu Hau river they set strongly across the channel on both tides, adding to the difficulty and danger of the navigation. Where the Malu Hau and Hainan strait currents meet there are sometimes eddies which have the appearance of breakers.

On the west side of Nau chau, northward of Tamsui, the flood stream flows from the northward, and to the southward of that place from the south-east; these two branches meet off Tamsui, and have caused the banks shown on the charts. On the ebb the stream separates or splits at the same place into two branches, one setting northward along the west side of Nau chau, and the other running in a south-east direction.

The maximum strength of the stream that has been observed is  $2\frac{1}{2}$  knots.

**BANKS IN AND NEAR THE FAIRWAY.—**Chart. 878 [2,713].  
Var. 1° E.

**Western approach.**—The westernmost bank in the approach to Hainan strait is a narrow ridge of sand, 9 miles in length, east and west, and one mile in breadth, within a depth of 5 fathoms, with its shoalest spot, 3 fathoms,\*  $1\frac{1}{2}$  miles from its west end, situated with cape Kami Lat. 20° 8' N.  
Long. 100° 24' E

A bank of sand 2 miles in extent east and west, and about a mile or more wide at the western end, with a depth of 4 fathoms on its shoalest part, lies with cape Kami bearing E.  $\frac{1}{8}$  S., distant 18 miles from that extreme.

The French ironclad *Vauban* in 1898, with a draught of 27 feet, Lat. 20° 13 $\frac{1}{2}$ ' N.  
Long. 100° 34 $\frac{1}{2}$ ' E touched the ground in a position from which Lamko hill bore S. 10° E. distant 18 miles. This is about 2 miles W.S.W. of the position given for the depth of 4 fathoms mentioned above, and it may be a portion of the same bank, as no soundings have been taken between these positions. Shoal water appeared to extend still further to the southward.

A bank of sand half a mile in extent, with a least depth of  $3\frac{1}{4}$  fathoms. Lat. 20° 17 $\frac{1}{2}$ ' N.  
Long. 100° 42 $\frac{1}{2}$ ' E lies with cape Kami bearing E. by S.  $\frac{1}{2}$  S., distant  $12\frac{1}{2}$  miles. Depths of 6 to 7 fathoms will be found a short distance from it.

A narrow ridge of sand one mile in length with a least depth of  $4\frac{1}{2}$  fathoms, lies with cape Kami bearing E.  $\frac{1}{2}$  S., distant  $6\frac{1}{2}$  miles.

**Eastern approach.**—The dangerous sandbanks in the eastern approach, upon which the sea usually (but not always) breaks during the North-east monsoon or with easterly swell, have deep water channels between them, but extreme caution is necessary in using these passages, as the tidal streams are uncertain, and the shoals in most cases far from land. These channels should not be used at night, or in thick weather.

The following is a general description of the different banks:—

North-east and North banks separate North channel from Middle channel; Seal bank forms the west side of North channel.

**North-east bank**, with 4 fathoms over it at low water springs, Lat. 20° 28' N.  
Long. 110° 58' E. is one mile in length north and south, and half a mile in breadth; its north-east extreme is in the position noted.

**North bank**, situated between 3 and 8 miles southward and south-westward of North-east bank, is about 7 miles in length, with an average breadth of about one mile; on its western end there is a rock with 3 feet water over it\*, with Hainan bluff bearing S.W.  $\frac{1}{8}$  S. distant 15 miles. There are several places on North bank with depths of one to 2 fathoms. A bank with depths of  $3\frac{1}{2}$  to 5 fathoms, lies between one and  $2\frac{1}{2}$  miles southward of the rock with 3 feet water, just mentioned.

Chart, 876 [2,713]. **Seal bank** is 5 miles in length in an east and west direction, 3 miles Lat.  $20^{\circ} 23' N.$   
Long.  $110^{\circ} 47' E.$  in breadth at its western end, and half a mile at its eastern; from the Var.  $1^{\circ} E.$  latter Hainan bluff bears S.S.W.  $\frac{1}{2}$  W. distant  $16\frac{1}{2}$  miles. The least water upon the bank is 2 fathoms.

Shoal water exists at a distance of from 2 miles to 5 or 6 miles northward and north-westward of Seal bank, stretching east-north-eastward from Sheldrake island (see page 534), but the examination did not extend beyond this.

**West bank** lies in the western approach to North and Middle channels. It is about 5 miles in length east and west, and  $1\frac{1}{2}$  miles in breadth towards its west end,\* with several patches of 3 feet. From its eastern extreme Hainan bluff bears S. by W.  $\frac{3}{4}$  W. distant  $8\frac{1}{2}$  miles. Little bank between West bank and the bluff has been mentioned in page 530, with inner Passage.

**South banks**, two groups, lie between the Middle and South channels; the northernmost bank, with 2 fathoms least water, is 8 miles in length in an east and west direction, and two-thirds of a mile in breadth. Its west extreme lies with Hainan bluff bearing S.W. by W.  $\frac{1}{2}$  W. about  $6\frac{1}{2}$  miles.

The southernmost bank is about 13 miles in length east and west, with a breadth varying from a half to 2 miles. Near its eastern extreme is a patch of  $2\frac{1}{4}$  fathoms, with Mofu hill bearing S.  $\frac{3}{4}$  W., distant  $13\frac{1}{2}$  miles. Its western portion is known as the Hainan head bank, page 531. Midway there is a one-foot patch\*, and there are many other patches with depths of from one to 3 fathoms.

**DIRECTIONS.**—The following objects will be found useful in fixing the position when passing through Hainan strait, namely, Lamko hill, Lamko point lighthouse, the Hummocks, Kiung chau pagoda, Pochin hill pagoda, Hainan head and Mofu hill on the south side; whilst on the north side are cape Kami lighthouse, the Shenwan range and the conical mound at Hai au bay; see also landmarks, when approaching the western entrance, on page 523.

In the eastern approach the Taya islands are invaluable.

Lat.  $20^{\circ} 4' N.$   
Long.  $110^{\circ} 30' E.$

**Entering Hainan strait from the westward**, the best channel is that between the westernmost bank, which has a least depth of 3 fathoms, and the coast of Hainan, giving a berth of about 4 miles to the island. If bound to Hoi hau, the treaty port of Kiung chau, directions for entering will be found on page 527. (The lights on Lamko point, cape Kami, and at Hoi hau render the navigation fairly safe at night.)

**Proceeding eastward** from Hainan strait there is no great difficulty in taking either the North, Middle, or South channels, the vessel's departure having been carefully taken from off Hainan head and course shaped accordingly, but the Middle channel is preferable, The directions for Middle and also South channels, given below and on page 538, reversed, will suffice to take a vessel safely through.

The pagoda on Pochin hill bearing S.W.  $\frac{1}{2}$  S., astern, leads out through North channel to sea.

For the Inshore passage northward, *see page 533.*

Vessels bound from Hainan strait to Hong Kong, finding the monsoon strong, may, on clearing the banks, shape course under fore-and-aft sails for Tien pak, on nearing which, the wind and sea usually moderate. They should then pass northward of Round island by day, or outside Mandarin's Cap by night (page 554), and close past Waikaup island, when they can haul up for Great Ladrone island. Fine weather will generally be experienced between Nau chau and St. John's islands.

**Entering Hainan strait from the eastward** the Middle channel is preferable in clear weather; in hazy weather South channel, which is buoyed and near the land, should be taken.

The banks do not always break, and the depths, being irregular, give but little warning of approach.

**North channel**, for which there are no marks, is not recommended.

**Middle channel** is the widest, deepest, shortest, and therefore the best approach to Hainan strait from the north-eastward in clear weather. Lat. 20° 16' N.  
Long. 111° 0' E.  
The North Taya island, 648 feet in height, will be seen from a distance of about 30 miles, and should be approached bearing about S.S.W.  $\frac{1}{2}$  W. Mofu hill will be visible shortly after Taya is sighted, being about the same height, and cross bearings of these two objects will, when the vessel is abreast the entrance to Middle channel, be broad enough to give a good position of the vessel. The course through the fairway is about W.  $\frac{1}{2}$  S., which course also leads between West bank and Little bank, situated northward of Hainan head; thence keep in mid-channel unless bound to Hoi hau.

Vessels proceeding to Pak hoi should round cape Kami at a distance of 3 to 4 miles, avoiding the 4 $\frac{1}{2}$  and 3 $\frac{1}{2}$  fathoms banks westward of Tong Chong bay; then haul up for Chai une island, sighting it, and thence passing west of Guie chau island before steering for Kwantau point, Pak hoi.

Those bound to Haifong, should keep the south shore of the strait until abreast Hau Sui bay, then steer for Bacht long vi. or Nightingale island, and from thence to the Norway islands. East or west currents of considerable strength may be experienced on this track, but very little north or south set need be feared, unless the monsoon is very strong.

Chart 876 [2,713]. The lights at cape Kami and Lamko point will be of great service to vessels navigating at night.

Lat. 20° 5' N.  
Long. 110° 56' E.

**South channel and Inner passage** runs close to Hainan island, and is recommended in hazy weather. The Taya islands should be sighted, whence course may be shaped for Mofu hill, the north-east extreme of Hainan.

Plan on Chart,  
876 [2,713].

A vessel will be in the fairway when North Taya bears E. by S.  $\frac{1}{2}$  S., and Mofu hill S.W. by S., distant  $8\frac{1}{2}$  miles; from whence a West course should be steered with Pochin pagoda right ahead, until Hainan point bears N.  $61^{\circ}$  W., which being steered for leads in between the 2-fathoms patch to the northward and the Riversdale patch of  $2\frac{1}{2}$  fathoms, marked by a black buoy with triangle, to the southward. It would be advisable to have the point a little northward of the bearing given when abreast the 2-fathoms patch and a little southward when near the Riversdale, to give each of them a wider berth.

When Hainan *bluff* (not the point) bears W.  $\frac{1}{4}$  N. steer N.N.W. between the red buoy on the starboard hand and the black buoy off Hainan point reef on the port hand. From abreast the latter buoy course may be shaped to the westward, passing northward of Baksha banks.

Lat. 20° 10' N.  
Long. 110° 42' E.

In Inner passage, caution is necessary on the flood, which sets strongly towards Hainan point reef, and when westward of Hainan bluff the indraught into Pochin bay must be allowed for. The tidal stream also sets very strong across the western entrance to Inner passage, rendering it advisable at times to go eastward and northward of Little bank; a danger angle of  $40^{\circ}$  between Hainan bluff and Pochin pagoda will carry the vessel round the bank well southward of West bank, whence course may be shaped westward through the fairway as from Middle channel.

**Tidal streams.**—In North channel the flood sets S.W. by W. from one to 3 knots an hour, and the ebb N.E. by E. from one to  $3\frac{1}{2}$  knots.

In Middle channel, at the position charted (12 miles N.E. by E.  $\frac{3}{4}$  E. of Hainan point), the flood sets N.N.W. from  $1\frac{1}{2}$  to 3 knots, and the ebb N.E. by E. one to 3 knots. (This is probably for only a portion of the time of flood and ebb.)

In Inner passage the flood sets N.N.W. from one to 3 knots, and the ebb S.S.E. from  $1\frac{1}{2}$  to 3 knots, but at Hainan point the tide is very strong, 4 to 5 knots at spring, and irregular.

Southward of Little bank the flood sets to the South-west at the rate of 3 knots towards Pochin lagoon.

A knowledge of the set of the stream on the west side of Hainan strait, or in fact anywhere over Tong King gulf with the rise and fall of the tide, has not yet been arrived at. In every 24 hours the set is easterly

## 'al Stream in Hainan Strait.\*

Moon's Age.	January.		February.		October.		November.		December.		Moon's Age.
	EAST.	WEST.	EAST.	WEST.	EAST.	WEST.	EAST.	WEST.	EAST.	WEST.	
1	3 a.m.	11 a.m.	SLACK.		3 a.m.	10 a.m.	3 a.m.	11 a.m.	3 a.m.	11 a.m.	1
2	4 "	Noon	SLACK.		3 "	11 "	4 "	Noon	4 "	Noon	2
3	5 "	1 p.m.	SLACK.		4 "	Noon	5 "	1 p.m.	5 "	1 p.m.	3
4	6 "	2 "		Noon.	5 "	1 p.m.	6 "	2 "	6 "	2 "	4
5	7 "	3 "		1 p.m.	6 "	2 "	7 "	3 "	7 "	3 "	5
6	8 "	4 "		2 "	7 "	3 "	8 "	4 "	8 "	4 "	6
7		SLACK.		3 "	8 "	4 "	9 "	5 "	9 "	5 "	7
8		SLACK.		4 "	9 "	5 "	10 "	6 "		SLACK.	8
9	8 p.m.	5 a.m.		5 "	10 "	6 "	11 "	7 "		SLACK.	9
10	9 "	6 "		6 "	11 "	7 "		SLACK.		SLACK.	10
11	10 "	7 "		7 "	Noon	8 "		SLACK.	10 p.m.	6 a.m.	11
12	11 "	8 "		8 "		SLACK.		SLACK.	11 "	7 "	12
13	Midnight	8 "	N	9 "		SLACK.	Midnight	8 a.m.	Midnight	8 "	13
14	1 a.m.	9 "		10 "		SLACK.	1 a.m.	9 "	1 a.m.	9 "	14
15	2 "	10 "	ACK.		1 a.m.	9 a.m.	2 "	10 "	2 "	10 "	15
16	3 "	11 "	ACK.		2 "	10 "	3 "	11 "	3 "	11 "	16
17	4 "	Noon	ACK.		3 "	11 "	4 "	Noon	4 "	Noon	17
18	5 "	1 p.m.		11 a.m.	4 "	Noon	5 "	1 p.m.	5 "	1 p.m.	18
19	6 "	2 "		Noon	5 "	1 p.m.	6 "	2 "	6 "	2 "	19
20		SLACK.		1 p.m.	6 "	2 "	7 "	3 "	7 "	3 "	20
21		SLACK.		2 "	7 "	3 "	8 "	4 "	8 "	4 "	21
22		SLACK.		3 "	8 "	4 "	9 "	5 "		SLACK.	22
23	7 p.m.	8 a.m.		4 "	9 "	5 "	10 "	6 "		SLACK.	23
24	8 "	4 "		5 "	10 "	6 "		SLACK.		SLACK.	24
25	9 "	5 "		6 "	11 "	7 "		SLACK.	9 p.m.	5 a.m.	25
26	10 "	6 "		7 "		SLACK.		SLACK.	10 "	6 "	26
27	11 "	7 "		8 "		SLACK.	11 p.m.	7 a.m.	11 "	7 "	27
28	Midnight	8 "	ACK.			SLACK.	Midnight	8 "	Midnight	8 "	28
29	1 a.m.	9 "	ACK.		1 a.m.	9 a.m.	1 a.m.	9 "	1 a.m.	9 "	29
30	2 "	10 "	ACK.		2 "	10 "	2 "	10 "	2 "	10 "	30

taken from this table.

Gunboat "Tsing-Po," 1876.



for about 8 hours, and westerly for about 16 hours throughout the year, Chart, 876 [2,713].  
Var. 1° E.  
at the rate of one to  $2\frac{1}{2}$  knots, and off cape Kami as much as 3 knots.

On full and change days in summer the E. set commences at 3 p.m.

"	"	"	W.	"	11 p.m.
"	"	" winter	E.	"	3 a.m.
"	"	" "	W.	"	11 a.m.

and occurs about one hour later every day.

A table has been compiled from observations by Captain de Longueville, of H.I.C.M. gunboat *Tsing Po*, which gives the time of the change of set of the tide in Hainan strait for every day in the year.\*

When the stream is running to the westward a wide berth must be given to cape Kami, as in that vicinity there is considerable northing in the set.

**Overfalls.**—Heavy overfalls or tide rips exist all over Hainan strait, but especially between Hainan point and Little bank, and to the northward of Little bank.

There are also patches of discoloured water, which, however, are chiefly composed of minute algae.

\* See table, page 538a. This table holds good from the eastern banks in Hainan strait to Bacht Long vi. or Nightingale island in the gulf of Siam. It was found correct by H.M. Surveying Vessel *Magpie* whilst surveying the Strait during the summer and autumn of 1881.

General chart, 2,062 [2,700].

## CHAPTER XV.

SOUTH-EAST COAST OF CHINA.—HAINAN STRAIT TO  
CANTON RIVER.

Chart. 3,349  
[2,680].  
Var. 1° E.

**NAU CHAU ISLAND**, lies on the east side of Lei chau peninsula, at about 33 miles northward of the eastern entrance to Hainan strait. The island is about 5 miles in length, and its summit situated on the eastern side is bare and 279 feet in height. The island is well cultivated, and is separated from the island within it, Tan hai, by the passage below referred to. When seen from the offing, Nau chau appears as a flattened cone which affords a good landmark for vessels approaching the coast.

Lat. 20° 54' N.  
Long. 111° 35' E.

**LIGHT.**—On the summit of the island, from a cylindrical stone tower, 51 feet high, a *flashing white* light is exhibited every *five seconds*, at an elevation of 338 feet above high water, visible in clear weather from a distance of 25 miles.

**Beacons.**—At the northern end of the island there is a tower, painted in black and white horizontal bands, and W.N.W. of the tower, about 655 yards distant, a cone-shaped structure, painted white with one black horizontal band in the centre, which must not be mistaken for it. These marks are useful to vessels approaching Nau chau from the northward.

**Foul ground.**—From the south-eastern end of Nau chau island foul ground, consisting of numerous submerged sand banks, with apparently deep-water channels between them in places, extends to a distance of from 3½ to 5 miles in a southerly, south-easterly, and easterly direction, within which area lies the Grand Plateau and many other isolated rocky ledges that show above water.

\*Lat. 20° 58' N.  
Long. 110° 35' E.

The south-west side of this foul ground is marked by two conical buoys, painted red, moored in a depth of 4½ fathoms, and situated, respectively, S. by W. 3½ miles, and S. ¾ E. nearly 4½ miles, from the south extreme of Nau chau. These buoys are on the north-eastern side of *Passe de la Surprise*,\* the channel leading to Nau chau passage.

**Spit.**—Between the south-west extreme of Nau chau and the west point of the island a sandy spit, with less than one fathom water extends 1½ miles from the shore; in the channel between it and the flats extending from Tan hai island there is a depth of 3½ fathoms. A red conical buoy is moored off the end of the spit in 4½ fathoms, with the west point of Nau chau bearing N.E. ¼ E., distant 1⅞ miles.

General charts, 2,062 [2,706] and 2,061a [2,680].

**Nau chau.**—The town of Nau chau is situated on the western side [Chart, 3,340  
of the island, off which there is good anchorage, used as a port of call [2,630].  
by the junks trading to Tong King gulf. It is governed by a Civil  
Mandarin.

Fort point, the western point of the island, is the eastern point of entrance to the port from the southward. It ends abruptly in a high and long clump of trees, at the extreme of which fort Boutet, in ruins, is just visible. It is steep-to.

The north point of the island is composed of sandhills 40 to 50 feet high, which are easily recognised; it forms the eastern point of entrance to the port from the northward. Rocky ledges extend to the north and west for the distance of nearly a mile from it.

**Nau chau passage.**—The channel between the island and Clump point is nearly 2 miles wide, but it is reduced by banks extending from the latter to about one third of a mile in width.

**Clump point,** westward of Nau chau island, is the south-east extreme of Tan hai island; it is low and sandy, with a clump of trees within it.

**Horse-shoe bank** is a sand bank 3 feet high at its eastern end, of considerable extent in an east and west direction, and is connected with Clump point at low water springs.

**Middle bank,** awash at its centre at low water, and covered with less than 6 feet for half its length, forms the west side of the anchorage at Nau chau, and within the depth of 3 fathoms, extends for a distance of 4½ miles from Horse-shoe cay, parallel to the coast of Nau chau island.

**North-west bank.**—A bank with less than one fathom water over it extends off the whole north-west coast of Nau chau island, to the average distance of about half a mile; at the northern point\* the bank [Lat. 20° 57' N.  
is marked by a black conical buoy in 3 fathoms, distant one mile from Long. 110° 34' E.  
some conspicuous trees on a projecting rocky ledge, which is in line with the tower painted in black and white bands, bearing about S.E. ¼ E. Off the western side of the bank, a black barrel buoy lies in deep water, at the distance of 1½ miles northward of West point.

**Reefs.**—Eastward of Jacquelin hill, 1,364 feet high, in the northern approach to Nau chau, the bank fronting the shore extends 3 miles off, outside of which there are many patches; the outer patch charted lies 7½ miles E. ¼ N. of the hill, and has a depth of 2½ fathoms, and S. by W. ¾ W. from it there is another of the same depth. The north side of the upper plateau of Jacquelin hill, in line with a wall near the shore, bearing N. 88° W., leads midway between these reefs and other reefs,

Chart, 8,349  
[2,630].  
Var. 1<sup>b</sup> E.

\*Lat. 20° 47' N.  
Long. 100° 38' E.

and northward of a small 2½-fathoms patch 3 miles within them, marked on its north-east side by a black conical buoy.

**Directions.—Approaching from the southward.**—(In-shore passage, *see* page 533.) Nau chau may be steered for with the lighthouse bearing N. ¼ W., and when distant 6½ to 7 miles therefrom, proceed on a N.W. course through Passe de la Surprise,\* and south-westward of the banks extending from the island. When the north extreme of Nau chau is open north-westward of West (Fort) point, bearing N.E. ½ N., steer for it, passing West or Fort point at the distance of a cable.

**Anchorage.**—Good anchorage may be found in a depth of 7 fathoms, mud and sand, about 7 cables north of West point.

Anchorage may also be taken southward of Horse-shoe bank, in 5½ fathoms, sand, with the lighthouse in line with a mark on the beach bearing E. by N.

There is good anchorage anywhere off the north end of Nau chau island, in depths of 6 to 7 fathoms, mud.

**Approaching from the north-eastward,** Jacqueline hill will be first sighted; do not approach within 9 miles until it bears W. by N., by which time Nau chau island will be seen, when steer for the north point of that island, rounding it at a distance of a mile, to avoid the rocky ledges extending nearly that distance from it. When North-east point bears S.E. by E. steer for West or Fort point, bearing about S.S.W. ½ W., which will lead to the anchorage between Middle bank on the west, and the ledges extending from the island. *See* buoys, page 541.

The Inshore passage, southward, runs nearly straight for the Black rocks, within much unsurveyed ground, *see* page 534. It is used by junks and steamers with local knowledge.

**Swatchway.**—Small craft proceeding to sea by the north channel can pass to the southward and westward of the Middle bank in not less than 2½ fathoms at low-water springs, taking care not to open South-west point of West or Fort point, and hauling to the north-east when past the Middle bank.

**Tides.**—It is high water, full and change, at West or Fort point, Nau chau, at 10 h. 20 m.; springs rise 12½ feet, neaps 8 feet.

At Nau chau the stream runs 2½ knots at springs, changing about one hour after high and low water, the flood setting to the southward, and the ebb to the northward.

In the Inshore or Malu Hau passage immediately south of Nau chau, the flood sets north-west and the ebb south-east. In Gopai narrows, the flood sets N. by W. and the ebb S. by W. See page 534.

**LEI CHAU** is the principal town on the peninsula of the same name. It is situated on a river, about 5 miles from the east coast and about 25 miles westward of Nau chau island. Its exports consist of sugar, oil, bean cake, and matting for sails. The entrance to the river on which it is situated is approached by the channel between the banks westward of Nau chau island, its northern branch leading to Kwang chau wan.

**KWANG CHAU WAN BAY.**—The following description and directions are from a French Hydrographic Notice, and with the aid of the recently published charts, simplifies the navigation of Kwang chau wan bay and the lower part of Matshé river.

The bay of Kwang chau wan measures  $6\frac{1}{2}$  miles in an east and west direction and  $5\frac{1}{2}$  miles from north to south; the navigable portion is reduced to a comparatively narrow channel, well defined by the 5-fathoms line, and which is a continuation of the principal arm of the river Matshé, whose mouth is situated in the north-western part of the bay.

The depths in this channel are very irregular, varying from  $5\frac{1}{2}$  to 23 fathoms, in some places, very suddenly.

The shores of the bay are low and sandy, fronted almost everywhere by long banks of soft mud and by shingle, which uncover at low water. There are, however, some reddish cliffs, and numerous clumps of trees which shelter villages.

**Jacquelin hill**, 364 feet high, situated on the south side of the entrance to the bay and 3 miles from the channel, forms a very good landmark; a series of sand dunes extend from it to the coast.

**Beacon.**—A sea-mark is erected near the shore, 875 yards S.  $88^{\circ}$  E. from the summit of Jacquelin hill.

**Coast.**—On the north side of the entrance are several wooded hills which are prolonged towards the north by high sand dunes. The most remarkable of these hills, called Colline Verte (Green hill), is wooded only on its south and west sides.

Bouquet point, situated on the northern point of the entrance at its south-west extremity, has on it a small wooded hill which from a distance has the appearance of a saddle.

**Beacons.**—On the summit of Colline Verte is a stone pyramid by which this hill may be recognised when it appears above the horizon.

On the shore, 820 yards S.  $35^{\circ}$  E. from the above pyramid, is a sea-mark about 16 feet in height, coloured black and white.

Charts, 3,340  
[2,630], 3,496  
[3,457].  
Var. 1° E.

A pyramid of planks, coloured black and white, is erected on the beach to the southward of the hill on Bouquet point.

**South shore of the bay.**—This shore, which is the north coast of Tanhai island, consists at first of a low sandy point, uncovering at low water and forming the northern side of the mouth of a creek; a large sand dune is seen over this point.

To the south-west of the creek, the coast for a distance of 2 miles consists of cliffs, much broken up, and about 65 feet in height; along the foreshore are patches of rocks.

The coast is then low and sandy as far as Cylindre point, where it again rises to a low cliff.

Lat. 21° 3' 5" N.  
Long. 110° 29'  
52" E.

**An Observation spot**, situated on the cliff, is marked by a stone beacon covered with plaster and coloured black.

**A beacon** similar to that on Colline Verte, coloured white, is erected on the eastern slope of a depression to the westward of the observatory beacon, and is situated S. 39° W., at a distance of 335 yards from it.

It is called Pyramide de la Dépression; it has been partly destroyed by a typhoon.

Lat. 21° 8' N.  
Long. 110° 24' E.

**LIN FA THAN ISLAND**, situated about half a mile to the northward of Cylindre point, is well cultivated. In the centre is a small wood in which is a village.

The north and east sides of the island are bordered by banks of rock and mud; from the south-east point a long strip of sand, which uncovers for a distance of nearly 6 cables, extends to the south-eastward.

The passage between the island and Cylindre point is full of rocks and banks.

**Beacons.**—On the north coast of Lin fa than island, a white stone pyramid has been erected.

Another beacon, consisting of a pyramid of bamboos covered with wicker-work and coloured white, is situated 273 yards S. 2° E. from the former.

**West shore of the bay.**—Between L'Estoc channel and the river Matshé, the coast is fronted by a bank of sand and rocks extending to a distance of one mile from the high-water mark.

In the background is a clump of trees relatively high, and to the left of it is a small detached conical hill, called Lontain summit.

Lat. 21° 9' N.  
Long. 110° 34' E.

**Portalis point.—Beacons.**—The right bank of the river Matshé terminates at Portalis point, which is a red cliff.

About 1,100 yards to the westward of this point are two white pyramidal beacons which when in line bear N. 44° W. The southern beacon has been destroyed by a typhoon.

**North shore of the bay.**—This shore, which is the south coast of the Isles des Aigrettes, is, after leaving Bouquet point, low and swampy and intersected by several waterways which permit fairly large junks to communicate with the Des Aigrettes channel and the town of Uampu.

At Pyramide point, situated about  $3\frac{1}{2}$  miles from the entrance of the bay, the coast consists of red cliffs.

**Port Beaumont** is situated about 2 miles north-westward of Pyramide point on Beaumont or south Pak hai island. The Port office is here, also huts for about 100 men, and a small workshop containing the necessary tools and material for the maintenance of the buoys in the bay.

In 1899 there were here two small tugs and a steam water tank.

Owing to the want of shelter in the anchorage off port Beaumont, it has been almost decided to transfer the marine establishments either to Nivet point, opposite fort Bayard, or to above Caravan point, where it is also proposed to build the administrative and commerical town of the territory.

**Tatchin island**, situated between port Beaumont and the main channel of the Matshé river, is well cultivated, and has on it several villages.

A bank of sand and rocks, which uncovers at spring tides for a distance of  $1\frac{1}{10}$  miles from the coast, extends to the southward of the island.

**Yu yu channel.**—Port Beaumont is connected with the Bouquet anchorage by several channels. One of these, the Yu yu channel, can be used with local knowledge, and appears to have not less than 8 feet of water.

**Beacon.**—The Yu yu channel passes close to the Yu yu rock, on which is a wooden beacon about 20 feet in height, surmounted by a circular top-mark.

**MATSHÉ RIVER.**—This river is nearly a mile in width at its mouth when it enters the bay between Portalis point and Tatchin island. The navigable channel has a depth of  $5\frac{1}{2}$  fathoms and passes close to Tatchin point, which is steep-to, whilst Portalis point is fronted by a mud bank on which are numerous rocks. Northward of Portalis point is a long sand beach on which the only noticeable object is a shooting butt composed of loose sand.

To the northward of Tatchin island is the entrance to port Beaumont, which is almost blocked by a bank extending from the north end of Tatchin.

**Beacons.**—The deepest water in this entrance is marked by two wooden beacons, in line bearing S.  $53^{\circ}$  W., erected on the north side of

Charts, 3,349  
[2,630]. 3,386  
[3,457].  
Var. 1° E.

Charts, 3,349  
[2,680], 3,486  
[3,467].  
Var. 1° E.

Tatchin. The higher beacon is seen well above the trees, but the lower one, which is not as high as the cliff, is very difficult to make out.

The least depth in this channel is 16 feet.

Lat.  $21^{\circ} 12' N.$   
Long.  $110^{\circ} 34' E.$

**Chenal des Aigrettes** lies to the northward of the island of that name, it is navigable for large boats, and is used by the steam water-tanks going to obtain water from the Uampu river.

**Nivet point**, situated on the north side of the junction of the Matshé river and Des Aigrettes channel, is steep-to; behind it is a large clump of trees sheltering a village.

**Fort Bayard**.—Opposite Nivet point on the right bank of the river is fort Bayard, the flagstaff of which can be seen as far as the mouth of the river.

Extending from this point is a bank of mud which at spring tides dries for more than half a cable beyond the end of the jetty constructed in front of the fort.

There is a mooring buoy off this jetty.

**Alouette rock** is situated nearly in the middle of the river, abreast the north-west extremity of Beaumont island. It consists of two shoals about a cable apart in the direction of the channel, on the southern one there is a depth of only one foot at low water, and on the northern of 9 feet.

**Buoy**.—A spindle buoy, painted black, is moored in deep water on the eastern side of these dangers; it should be left on the port hand in ascending the river and may be passed at a very short distance.

**The right bank** of the river to the northward of fort Bayard forms a curve at the bottom of which is seen Bonheur tower, an isolated monument easily recognisable. In the background, a chain of heights, on which is situated the post of Hoï tau, approaches gradually to the river and terminates at Caravan point, which is on the south side of the Chékam estuary.

On the bank, midway between Bonheur tower and Caravan point, are two twin hillocks about 50 feet in height.

**The left bank** of the river to the northward of Nivet point consists of a low cliff nearly horizontal, on the summit of which is cultivated ground and numerous clumps of trees, containing villages.

Two miles to the northward of Nivet point is a large bay formed by the mouths of several streams. On the north shore of this bay is a green isolated hillock about 40 feet in height, known as the Tumulus. Behind, appears in the distance, Nord peak, an isolated conspicuous mountain.

**The channel.**—From the mouth of the river as far as a line joining the Tumulus with Caravan point, is a regular channel at least 3 cables in breadth with depths of  $5\frac{1}{2}$  to 19 fathoms.

To the northward of this line the channel narrows, nevertheless, large vessels can find good anchorage in not less than 5 fathoms off the mouth of the Chékam, in a position about  $2\frac{1}{10}$  miles to the northward of Caravan point.

A narrow channel, with not less than 16 feet of water, leads from here to the important town of Chékam and terminates in a cul-de-sac after passing the south end of Taocien island.

The river is easily navigable for gunboats as far as the passes of Shekmun, a short distance below the Chinese town of Montao. These passes are very narrow and strewn with rocks. The French gunboat *Comète* ascended them in 1899 and anchored off Montao, but the anchorage there is very narrow and the current runs very strongly.

The survey of the river has not been carried beyond Montao; above this point it ceases to be navigable for large junks.

**Prohibited anchorage.**—A submarine cable is laid in the Matshé river between fort Bayard and Nivet point. Its position is indicated by four red triangular beacons, two at each of the above places, marking a rectangular space within which anchorage is prohibited. A buoy, called *Entrecasteaux*, lies near the cable, and vessels must anchor either up-stream or at a distance of at least 164 yards below this buoy.

**APPROACH TO THE BAY.**—**Shoals.**—A long shoal composed of three banks extends from the north point of the entrance for about 6 miles to the south-eastward. During the N.E. monsoon these banks break heavily even in calm weather.

The survey of these banks and the channels which separate them has not been entirely finished, but it is known that no channel exists between the first and second breaking banks. Between the second and third banks, there is a narrow channel, which, in fine weather, could probably be used by small vessels.

A small bank, with from one to two fathoms over it, is situated about three-quarters of a mile to the southward of the southernmost breaker, in a position with mount Jacquelin bearing S.  $84^{\circ}$  W., distant  $5\frac{1}{2}$  miles, and the summit of Nan chau island S.  $3^{\circ}$  W.

From the south point of the entrance, a bank on which the sea breaks, extends to the south-eastward, for a distance of  $2\frac{1}{2}$  miles from the coast. Depths of from one to two fathoms are found on its outer end.

**Bar.**—This is connected with the breaking banks in the offing by a flat on which the depths, very irregular, vary from  $2\frac{1}{2}$  to  $4\frac{1}{2}$  fathoms.

Charts, 3,349  
[2,630], 3,488  
3,457].  
Var. 1° E.

This bar, which it is necessary to cross to enter Kwang chau wan bay by the eastern or main channel, was sounded over in 1898 and 1899 by French gunboats, when the least depth on the line of the leading marks was 21 feet at high water, but owing to the strength of the currents and the nature of the bottom, the depth is likely to change from time to time.

**Buoy.**—A black buoy is moored on the bar in a depth of 26 feet.

**Directions.**—From seaward steer for mount Jacquelin, keeping it between the bearings of N. 56° W. and N. 66° W. The summit of Nau chau is usually seen a long time before sighting mount Jacquelin, and affords a means of fixing the vessel's position.

(If not crossing the bar at once, an anchorage can be found to the northward of Nau chau island., with mount Jacquelin bearing about N. 59° W. and the summit of Nau chau bearing South.)

When the lighthouse on the summit of Nau chau comes in line with the tower (black and white horizontal bands) near the beach bearing South, alter course to North, and cross the bar keeping these beacons in line astern and leaving the black buoy at a distance of about half a cable on the port hand. When mount Jacquelin comes in line with the beacon (wall) on the beach bearing N. 88° W., the vessel will be over the shoalest part of the bar and should then alter course to N. 16° W., leaving on the starboard hand a 16-feet patch\* which the previous course would have led too close to.

\*Lat. 21° 14' N.  
Long. 110° 35 $\frac{1}{4}$  E.

Continue on this course until the pyramid on Colline Verte comes in line with the black and white beacon on the beach, bearing N. 35° W. Keeping these beacons in line, depths of not less than 5½ fathoms will be met with, and when mount Jacquelin bears S. 49° W. alter course to N. 76° W. to enter the channel leading into the bay. If the weather is clear, Lontain summit can be seen right ahead, midway between the north extremity of Lin fa than island and the clump of trees situated at its centre.

When in the narrow part of the channel, the black and white pyramid erected on the beach to the southward of Bouquet point will be seen, and when this pyramid comes in line with that on Colline Verte, bearing N. 69° E., steer to keep them in line astern. This leading line must be very carefully kept as it passes between two fishing places, and leaves on the port hand a rock not shown on the chart.

When mount Jacquelin comes in line with the Observatory beacon (black), a buoy will be seen two points before the starboard beam, and about 2 $\frac{3}{4}$  cables distant, which marks in a depth of 5½ fathoms a shoal which has only 13 $\frac{3}{4}$  feet over it. This buoy (not shown on Admiralty chart) may be passed very close-to if it is in its proper position. Alter

course now to starboard and bring the Pyramide de la Dépression (white) in Charts, 3,349  
[2,630], 3,486 line with the western end of the flat top of mount Jacquelin, when steer 3,457  
Var. 1<sup>st</sup> E. N. 48° W. on this transit.

When Colline Verte comes in line with Bouquet pagoda, steer about N. 11° W. It is not necessary to keep this exact course, one should edge rather to the northward to avoid the shoals off Lin fa than. Continue on this course until the Observatory beacon comes in line with the western end of the summit of mount Jacquelin, when steer N. 44° W., keeping these marks in line astern. A vessel should be on this line before shutting in Cylindre point behind Lin fa than. To lead through this reach there are also two beacons near Portalis point, but being close together they afford a less sensitive transit than the one given above.

After steering on this course for 2½ miles, a conical buoy, coloured red, will be seen on the starboard hand at a distance of rather less than a cable. This buoy is moored in 5½ fathoms on the south-west side of an 8-feet rock. When the two pyramids on Lin fa than come in line astern bearing S. 2° E., steer to keep them so, which will lead up to abreast Tatchin point. At low water this lead appears to pass too close to Tatchin point, but it is quite safe, as the point is very steep-to.

If proceeding up the river, after passing Tatchin point, Nord peak will be seen just open to the left of the trees on Nivet point, N. 21° E., which leads up the river and gives a good berth to Alouette rock. When past the buoy which marks this rock, steer for Caravan point; this leads near the mooring buoy off the jetty at fort Bayard. From thence keep Tumulus hill open to the left of Nord peak. (These two hills in line give when abreast Bonheur tower a depth of 23 feet on that side of the channel.) Above Caravan point it is advisable to send a boat ahead to mark the channel and find an anchorage.

**Chenal de L'Estoc**, which is the south-western entrance to Kwang chau wan bay, lies between Tanhai island and the mainland. Lat. 20° 38' N.  
Long. 110° 14' E.

This channel has been used by gunboats, but it is very difficult, being narrow and full of dangers, rendering it imprudent to use it unless possessing good local knowledge.

It offers the advantage of being sheltered throughout its length, and of avoiding, for small vessels, crossing the bar, on which during the N.E. monsoon there is at times a dangerous sea.

**Communication.**—A bi-monthly mail steamer runs between Kwang chau wan and Haifong, calling at Hoi hau and Pak hoi both going and returning.

Chart, 96 [2,722].  
Var. 1° E.

**Tides.**—There is great diurnal inequality in the tides in Kwang chau wan bay. The rise of tide varies from 13 to 17 feet, but the difference between two successive tides may only amount to 7 feet. The time of high water full and change is not given.

The coast north-eastward from Kwang chau wan is low and sandy for a distance of 10 miles, at which distance is a fort. Westward of the fort is an estuary fronted by breakers to the distance of 2 or 3 miles. About 10 miles within the fort is a peaked hill 460 feet in height, the only one in this neighbourhood. Thence the coast continues low for 24 miles in a N.E. by E. direction to An kang shan hill, situated close to the shore. This coast has not been sounded, and therefore should be given a wide berth.

Lat. 21° 25' N.  
Long. 111° 0' E.

**An kang shan**, at about 5 miles south-west of Sui tung, is a bold hill, 515 feet high, with a steep cliff on its sea face. A sunken rock is charted about half a mile off it, with others extending 4 miles to the westward.

Lat. 21° 27' N.  
Long. 111° 5' E.

**SUI TUNG HARBOUR.**—The entrance to this harbour is narrow and dangerous; the outer bar, upon which there is a depth of 6 feet at low water, is situated 6 miles eastward of An kang shan hill, and 2 miles S.E. by S. from the entrance to the harbour; the banks in the vicinity of the bar shift during strong winds, and the sea breaks heavily upon them.

Between the entrance and the An kang shan hill the coast is flat, with two remarkable rocky cones from 30 to 60 feet high.

Within the entrance a narrow channel between mud banks leads to the village of Sui tung, about 5 miles up.

**The village** of Sui tung has sometimes been improperly named Ou cheun; the capital town of the district is, however, named Um cheun, and is situated 12 miles north-west of Sui tung.

**Coast.**—About midway between Sui tung and Tihen pien is a white hummock about 70 feet in height. This coast is fronted by a shallow bank to the distance of about 3 miles, on which are the Black and Marble rocks.

Lat. 21° 24' N.  
Long. 111° 15' E.

**TIHEN PIEN, or TIEN PAK**, is the principal place on the south coast of China where salt is produced, and several hundred junks are employed in transporting it.

The outer portion of the peninsula forming the eastern side of the harbour is known as the high land of Lintoa; it is connected by an isthmus of sand with the high land within it, and has the appearance of a round mountain in coming from the eastward; its southern extreme is Sie ho point.

**Islets and Dangers.**—At  $1\frac{1}{2}$  miles E. by S. from Sie ho point, Chart, 98 [2,722].  
and one mile from the shore, lies a reef of rocks, on which the sea often  
breaks, having 10 fathoms close to its south side, and 7 fathoms between  
it and the shore. At half a mile south-west of Sie ho point lies Pauk  
piah, a large white rock, with 6 to 7 fathoms water between. Fungkai  
chai, a small island, lies about  $1\frac{1}{2}$  miles to the westward of Pauk piah ;  
about midway between is a sunken reef.

Tai fung kioh, about 2 miles south-westward of Fungkai chai, is of  
considerable height, and the outermost island in the approach. A shallow  
bank extends about  $1\frac{1}{2}$  miles northward of it, and a rock which breaks at  
150 yards off its north side. Marble rock on the shore bank westward of  
the entrance has been previously mentioned.

**Outer anchorage.**—A small vessel in want of shelter in the  
north-east monsoon period may anchor in 4 fathoms, sand and mud,  
westward of Sie ho point; the bay northward is very shoal, with a rock  
in it above water.

Large vessels may anchor in a depth of 6 fathoms between Fung kai  
chai and Tai fung kioh, or rather a little inside the latter island, which  
will shelter them from the south-west winds; and Fung kai chai and  
Sie ho point will break the force of the north-east winds. Good anchorage  
in about 4 fathoms, in fine weather, may also be obtained, with the summit  
of Tai fung kioh bearing E.N.E.

**Tihen pien harbour.**—The entrance to the harbour is  $1\frac{1}{2}$  miles  
in width, but the channel is reduced to about  $3\frac{1}{2}$  cables by the banks  
extending southward from both points of entrance. The channel is about  
the same width up to the town.

**The bar** is about 2 miles southward of the eastern point and the  
same distance westward of Sie ho point, and has probably about 21 feet  
over it at high-water springs. A small craft wishing to enter should first  
anchor near the north side of Fung kai chai, to be ready to cross the bar  
after having examined the channel if a pilot is not obtainable. The best  
time to enter would be near low water, as the banks on either side are then  
discernible usually from aloft. There is deep water within the bar, abreast  
the east point, with good shelter.

The channel, where the junks trading in salt lie close to the salt-pans,  
about  $2\frac{1}{2}$  miles to the northward of the low sandy point forming the east  
side of the entrance, decreases in depth to  $2\frac{1}{2}$  fathoms. A village, protected  
by a small fort on each side of the harbour, stands on the point.

**The town** of Tien pak is walled round, and is of considerable  
extent; it stands at the head of the shallow bay on the north-east side of  
the harbour, and can only be approached in boats at high water, through  
the creeks that intersect the extensive flat between it and the anchorage.

Charts, 96 [2,722],  
2,212 [2,723].  
Var. 1° E.

**Supplies.**—A sailing vessel touching here in distress may procure temporary masts, and get iron-work executed in the city: provisions may be obtained from the villages contiguous to the harbour. Some water may be obtained on the island Tai fung kioh, at a small spring near the shore; but the Chinese boats will bring it from the city at a very moderate rate.

**Tides.**—It is high water, full and change, on the bar of Tihen pien harbour, at noon; springs rise  $8\frac{1}{2}$  feet. During the north-east monsoon period there is almost a constant westerly current along this coast, with a velocity of from half to  $1\frac{1}{2}$  miles per hour.

Lat. 21° 26' N.  
Long. 111° 23' E.

**OFF-LYING ISLANDS.**—**Tai chuk chau** is an island 285 feet in height, situated about 7 miles eastward of Sie ho point, and 3 miles from the coast. There is anchorage three-quarters of a mile off its west side, in a depth of 6 fathoms, fine sand, with shelter from easterly winds. A rock lies between the island and the shore.

Lat. 21° 28 $\frac{1}{2}$ ' N.  
Long. 111° 29' E.

**Chin chu**, situated  $5\frac{1}{2}$  miles eastward of Tai chuk chau, and  $1\frac{1}{2}$  miles off shore, is 415 feet high, and covered with grass. A reef of rocks, on which the sea generally breaks, extends about a mile southward of it, and a rock, with a depth of 4 feet, lies S.W.  $\frac{1}{2}$  S. distant about  $1\frac{1}{2}$  miles from the island. Near the east side of the island there is a depth of 8 fathoms, foul ground; to the westward, between it and Tai chuk chau, there are depths of 7 to 8 fathoms, gravel. Rocks from 20 to 50 feet high lie inshore of Chin chu, within which is a shallow bay, having on the east side a fort and an inlet available for boats, named Gui tong, or Fish pass.

Lat. 21° 31 $\frac{1}{2}$ ' N.  
Long. 111° 39' E.

**Song yui point**, about 10 miles eastward of Chin chu island, is a low sandy point forming the south-west extremity of the bay, at the north-east part of which is Hui ling san harbour. Some islets or rocks lie off the point with sunken rocks just beyond, near which there are depths of 8 to 10 fathoms. The bay on the west side of the point is shallow, and Song yui town is situated at its head. About 2 miles within the low point is the south-west extreme of the Rugged mountains, which back the coast as far as the entrance to Hui ling san harbour.

**The Brothers**, situated 2 to 3 miles north-eastward of Song yui point, are two islets about three-quarters of a mile off shore, having sunken rocks projecting from them to the distance of from half to one mile.

**Hui ling san island** is about 12 miles in length, east and west, from  $1\frac{1}{2}$  to 4 miles in breadth, and 1,350 feet in height near its centre; it is separated from the coast by a narrow passage but little known; the harbour of the same name is on its south-west side.

Two islets, named Mame chau, lie close to the south-west point of the island connected to it and with Deep-water point to the northward by a reef and sand bank. At about a mile north-eastward of Deep-water point is a hill covered with trees, with the small fort of Hui ling Potoi on its summit, nearly hidden.

Bluff point, 3 miles eastward of the islets, is high, with a depth of 9 to 10 fathoms water near it.

At 4 miles eastward of Bluff point are three rocky islets about half a mile off shore, with a reef, steep-to, extending a short distance beyond. A little inland from these stands Sugar Loaf hill, 1,350 feet high, which does not show its peak when seen to the eastward of Bluff point.

At three-quarters of a mile southward of the east point of Hui ling san there is a reef of rocks nearly covered at high water, which has 6 fathoms close-to. Off the east point is an islet. On the east part of Hui ling san there is a patch of red sand, discernible when off the Mandarin's Cap.

**HUI LING SAN HARBOUR**, open to the south-westward, is situated close to the south-west extreme of the island of the same name; it affords good shelter to one or two vessels of moderate draught in a depth of 4 to 6 fathoms, in the north-east monsoon period, with plenty of room and shelter for small craft at all times.

The harbour is  $1\frac{1}{2}$  miles wide in the entrance between the Mame chau islets and the reef which breaks off the western shore, but the deep water, 5 fathoms and above, lies close towards the islets, and is but a quarter of a mile wide; a depth of 4 fathoms will be carried up as far as the fort at Hui ling Potoi, above which the depths rapidly decrease.

**Shoals.**—A shoal about 3 cables in length, with from  $2\frac{1}{2}$  to 3 fathoms, lies from 4 to 6 cables westward of Deep-water point, with the channel between. Mame chau islets are connected with Deep-water point by a sand bank, as before stated; thence eastward of a line joining Deep-water point to Tip chau island, and to the fort, the water is shallow.

A bank with less than 3 fathoms projects southward towards the anchorage from about the middle of the bay; its south-east extreme, bordering the anchorage lies S.W.  $\frac{1}{2}$  W., distant 6 cables from the fort.

**Directions.**—There is no difficulty in entering Hui ling san harbour; the only danger is the shoal with  $2\frac{1}{2}$  fathoms water on the port hand, westward of Deep-water point.

Mame chau island and Deep-water point should be passed at the distance of rather over a cable, and anchorage taken in about 7 fathoms, with the south extreme of Tip chau island bearing E. by N.  $\frac{1}{2}$  N. about 4 cables. There is anchorage as far up as abreast the forts, in 4 to 5 fathoms. Vessels of light draught can haul in under Deep-water point,

Chart. 2,212  
[2,723].  
Var. 0 $\frac{1}{2}$ ° E.

where there is anchorage in the bight in about 2½ fathoms, or in the boat harbour within Tip chau, where there are depths of 8 to 9 feet.

**Supplies.**—In the bay between Tip chau and Deep-water point, adjacent to a joss-house in ruins, fresh water may be procured.

Chino village, situated on the south-east side of the boat harbour, affords supplies of water and provisions. Carpenters and caulkers may be got to work on board, and smith's work can be executed at the village.

**Tides.**—It is high water, full and change, in Hui ling san harbour about 8 h. 30 m.; springs rise from 7 to 8 feet.

Lat. 21° 43' N.  
Long. 112° 14 $\frac{1}{2}$ ' E.

**COAST.—Tai oa point and bay.**—Tai oa point lies about 16 miles eastward of Hui ling san island; between is Deep bay. The depths decrease regularly from Mandarin's Cap, 15 miles in the offing, to 3 or 4 fathoms close to Tai oa point. In Tai oa bay, close north-westward of the point, the water is shallow; but small craft find shelter close off the village, in 2 fathoms. Some rocks covered at high water lie about a mile south-west of the island in Tai oa bay, with 4 to 5 fathoms around them.

The village of the same name within the point is the residence of a mandarin.

Deep bay westward of Tai oa point is fronted by shallow water extending about two miles in its eastern and 4 to 5 miles in its western part, but it has not been surveyed. The village of Yong Kong is shown on the chart as being situated about three miles up the river which enters the bay, between the forts on either side of the entrance.

The following islands and rocks lie off the coast, between Hui ling san and Haucheun:—

Lat. 21° 28' N.  
Long. 112° 21 $\frac{1}{2}$ ' E.

**Mandarin's Cap,** or Fan shi ak, is a barren white rock, about 200 feet high, with a sharp summit, situated about 11½ miles south-westward of Haucheun. At half a mile northward of it is a high rock with a rock awash between; in other places there are depths of 13 to 16 fathoms around the Cap.

**Currents.**—During the north-east monsoon period, and also in August and September, when easterly winds frequently prevail, the current sometimes sets to the westward at the rate of 3 miles an hour off Mandarin's Cap, abating only to 1½ miles when the tidal stream, under ordinary circumstances, would be setting to the eastward. Frequently in the south-west monsoon, if the wind shifts to the eastward, a westerly set is experienced.

Lat. 21° 33' N.  
Long. 112° 11' E.

**Nampang island,** 10 miles north-westward of Mandarin's Cap, is about 1½ miles in length and 780 feet high at its west end. It is safe to

approach, having 9 to 10 fathoms near the shore all round, but is destitute of fresh water.

**Round island**,  $3\frac{1}{2}$  miles westward of Nampang, 310 feet in height, is small and named from its appearance. S.S.W. of it about 2 miles there are two rocks; the southern is about 30 feet in height, and the northern about 10 feet. Between these rocks and the island there is a depth of 10 fathoms.

**Quoin** is an islet, 270 feet high, resembling a gunner's quoins, lying near the east side of Ni wok island, and  $2\frac{3}{4}$  miles northward of Nampang; in the passage between it and the latter the depth is 8 to 9 fathoms.

**Ni wok** is 390 feet in height and about a mile in length, with a sunken rock south of its east extreme. There is a rock 40 feet high between it and the Quoin.

**Tai wok**, about  $1\frac{1}{2}$  miles northward of Ni wok, is 345 feet high, appearing like a saddle when viewed from the south-west. S.W. by S. one mile from Tai wok there is a sunken rock with a depth of 7 fathoms all round, and on which the sea sometimes breaks (it is shown as awash on the chart).

Westward of a small temple near the beach, in the little bay on the north side of Tai wok, fresh water can be procured.

**Mong chau**, situated about 12 miles north-north-eastward from Mandarin's Cap, is a high island, about  $2\frac{1}{2}$  miles in length, and covered with verdure. There is a town near its summit, only visible from the south-east; some rocks extend off its north-east point to the distance of nearly  $1\frac{1}{2}$  miles. A rock 30 feet high lies about a mile south-east of its south extreme.

Small vessels may anchor in 3 fathoms at low water, on the west side of this island, during easterly winds; and fresh water may be procured at a small beach on that side, near the south point. This island as well as the western side of Haucheun are situated within the 3-fathoms line fronting the coast; the bottom is all soft, with a very regular decrease in depth from Mandarin's Cap to these islands.

**HAUCHEUN ISLAND**, or False St. John, is a high island, about 11 miles in length in a north-east and south-west direction. The south-west end is a bluff point, having a depth of 7 to 8 fathoms close-to; and close round it on the west side there are two small bays, with sandy beaches, having 3 fathoms water, where small vessels may take shelter during the north-east monsoon period.

A vessel of moderate draught will be sheltered from easterly winds by anchoring in 5 or 6 fathoms, soft mud, about a mile north-west of

Chart, 2,212  
[2,723].  
Lat.  $21^{\circ} 33' N.$   
Long.  $112^{\circ} 7' E.$

Chart. 2,212  
[2,723].  
Var. 0° E.

Haucheun bluff, the south-west extreme of the island. A few bullocks may be obtainable at the village, and fresh water in the southernmost small bay. This anchorage is generally known as Haucheun road or bay.

Plan on Chart,  
Lat. 21° 38' N.  
Long. 112° 34' E.

**Namo harbour** is formed between the south-west end of Haucheun and Namo island, and although small, it is safe and convenient for refitting a ship, or one otherwise requiring shelter.

**The south entrance** is preferable to the eastern entrance for vessels above 16 feet draught, having 6 fathoms in it, gradually decreasing to the sandy beach at the village of Namo at the head of the harbour, and is free from danger. This entrance is three-quarters of a mile wide, having Passage islet on the east side, joined to Namo by rocks.

**Anchorage.**—With an easterly wind, the best anchorage is about midway between Passage island and Green point (which has a round mound on it covered with grass, and forms the north-west point of Namo). Here the depth is 4½ to 5 fathoms, soft mud, sheltered by Namo island to the eastward, which is 500 feet high, and by the high land of Haucheun to the northward and westward. When it blows strong, a long ground-swell rolls in, rendering it necessary to anchor in the western part of the harbour, where there are depths of 4 to 4½ fathoms, mud, at low water.

In entering it is only necessary to give a berth of about 2 cables to Passage island, to avoid the rocks that extend half that distance from it.

**The eastern entrance**, between Namo island and the south-east part of Haucheun, has a depth of 3 fathoms on the bar which connects the island with Haucheun ; this passage is much encumbered with fishing stakes, but there are openings about 100 feet wide in places.

The best berth for a small vessel is abreast the sandy beach on Namo, which forms Green point; not so far in as to open the south entrance, but to see it over the narrow neck of that point. In this berth there is not less than 3 fathoms at low-water springs. Although slightly exposed to the easterly wind, no swell of consequence comes in.

In entering, the rocks mostly above water, extending 3 cables south-eastward of Namo island at 3 cables from its east extreme, should be given a berth. Coming from the eastward, pass southward of Boat rock, always above water ; thence in mid-channel to the anchorage mentioned, or farther westward off the village, if desired.

**Tides.**—It is high water, full and change, in Namo harbour at about 10 h.; springs rise 7 to 8 feet.

**Supplies.**—There are several watering places about the harbour, the largest and most convenient of which is in Watering bay, a sandy bay on Haucheun ; here the water comes close to the beach.

Namo village is situated at the north head of Namo harbour, westward of Watering bay. Fish, poultry, &c. are procurable. There is considerable surf on the beach during strong southerly winds; it is then advisable to land at Watering bay.

**The Five islands**, situated off the east side of Haucheun, are mostly small, and form the west side of the channel between it and St. John. Boat rock\*, situated about half a mile southward of Round islet, the southernmost of the group, is never quite covered, and the sea generally breaks over it.

Wasp island, the next northward of Round islet, is the largest of the group, and has some rocks close to its east side. Cricket, the third island, is high, and covered with grass. The fourth, Pipachau, is covered with grass, having some rocks above water projecting off its south end.

**Anchorages.**—There is no hidden danger near these islands, and a vessel of 15 feet draught will find sheltered anchorage between them and Haucheun, in 3 fathoms, soft ground. Supplies may be obtained from the town of Haucheun, situated in the bay fronting the islands.

All the space between these islands and St. John is apparently free from danger, with depths of 5 to 6 fathoms, soft ground. The tidal streams are strong at springs, the ebb setting southward and the flood northward through the channel; at neaps they are weak.

Northward of the Five islands the depths are  $4\frac{1}{2}$  to 5 fathoms, and continue the same in the channel between St. John and the island lying off the north-east end of Haucheun, leading to Gunjavar channel northward of St. John. Off the west extreme of St. John, or north or south of it, according to the wind, a vessel will find good shelter during bad weather; farther southward it is more exposed to southerly winds.

**ST. JOHN'S ISLAND**, or Chang cheun cham, is about 14 miles in length in a N. by E.  $\frac{1}{2}$  E. and opposite direction; near its centre it is nearly divided into two islands, the low sandy isthmus connecting the two high portions being less than a mile wide.\*

The bay eastward of the isthmus is known as Sanki bay, whilst that to the westward is Sandy bay.

**Rocks.**—A rock, visible only at low water, lies about half a mile off the north-east point of Chauwan bay, near the north-east extreme of the island. A reef of rocks, above water, lies about a mile off the north point of the island, with deep water on either side of them; and there is a reef on which the sea breaks at times, marked P.D., at about half a mile off the eastern shore, abreast Satie. The general depths off the eastern side of the island are from 9 to 10 fathoms.

Chart 2,212  
[2,723].  
Var. 0° E.

\*Lat. 21° 35' N.  
Long. 12° 34' E.

\*Lat. 21° 40' N.  
Long. 112° 47' E.

Charts, 2,212  
[2,723], 2,562  
[2,724].  
Lat. 21° 47' N.  
Long. 112° 45' E.  
Var. 0 $\frac{1}{2}$ ° E.

**Gunjavar channel** is the passage between St. John's island and the bank fronting the mainland to a distance of about 6 miles; it is about 2 to 3 miles wide with depths of 4 to 4½ fathoms over soft bottom, and somewhat deeper in the entrances; it is probably a good typhoon anchorage. Its western end has been mentioned in connection with the Five islands.

The only known dangers are the patch of 2½ fathoms, situated half a mile north-west of the outer islet in Sam chau tong bay; and the rocks (said to be above water), charted about a mile off the north point of St. John's island, the south point of entrance to the channel from the eastward.

The village of Samtong (Sam chau tong), situated in the western bay on the north side of St. John, affords small quantities of supplies.

Plan on Chart,  
2,212 [2,723].  
Lat. 21° 38' N.  
Long. 112° 45' E.

**Shito or Satie bay**, on the south-west side of St. John, is about 2 miles in length, and three-quarters of a mile in breadth at the entrance, with a depth of 6 to 7 fathoms, decreasing to 4 fathoms abreast a rock 4 feet high, half a mile below Satie village; it has not been closely sounded.

There is a watering place at the south side of the entrance.

Between Shito bay and the south point of St. John there is a small bay, having 6 fathoms water; some rocks, which are steep to, extend about a mile off its south-west point.

**Waikaup** is a high, rocky island, fronting the south-east end of St. John's island, being separated from it by a narrow passage. There are said to be depths of 13 to 14 fathoms water close to this island.

Lat. 21° 38' N.  
Long. 112° 52' E.

**Liuchiu** is an island 2½ miles in length east and west, of moderate height and barren aspect, separated from Waikaup and the south-east part of St. John by a channel 2½ miles wide, with a depth of about 12 fathoms; there is said to be deep water close to the island all round. A small islet lies close off its north-west end.

**TAIKAM ISLAND**, situated about 11 miles north-eastward of St. John's island, is of considerable height, of dark aspect, and in clear weather appears with red streaks. On the south part, in a small bay, behind a mound of sand near the beach, there is a village, and fresh water may be obtained at the western side of the beach. Between this island and Tonkwa, the large island to the north-westward, the water is shallow.

Lat. 21° 47' N.  
Long. 113° 3' E.

**Wizard rocks** lie off the south end of Taikam. The outermost, named the Flies, situated S. by E. 4½ miles from the extremity of the island, consist of a group of five or six rocks, about 30 feet high, having a depth of 10 fathoms, mud, at the distance of a cable from them. The South Wizard rock bears N. by W.  $\frac{3}{4}$  W., distant one mile from the Flies; and 1½ miles

northward from it lies the White Wizard. Three-quarters of a mile south-west from the White Wizard there is a rock covered at high water. There is another rock, always above water, one mile W. by N. from the White Wizard.

Charts, 2,212  
[2,723]. 2,562  
[2,724].  
Var. 0° E.

**Kukok**, the next island eastward of Taikam, is high and  $4\frac{1}{2}$  miles in length, east and west. Its south-west point\* has a rock about 15 feet high close to it. Under the high west side of the island there is good anchorage in a depth of 6 fathoms, with shelter from north-easterly winds. Fresh water may be obtained at the westernmost bay on the north side of the island.

**Tai mong island**, to the northward of Kukok, has Samkok islet joined to its south-west point by a reef of rocks dry at low water.

**Kau lan**, a high island, is separated from Kukok by a channel about 2 miles wide, with from 3 to 5 fathoms water in it, decreasing gradually to the northward, and affording sheltered anchorage for small craft. Sunken rocks extend a short distance off the south-east side of the island in places.

Sam long island lies  $1\frac{1}{2}$  miles eastward of the east point of Kau lan, with two islets situated from a half to one mile north-east of it. North-eastward from these islets the 3-fathoms line extends some 3 miles or more southward of San chau, forming the west side of Great West channel of Canton river, for which see China Sea Directory, Vol. III.

\*Lat.  $21^{\circ} 50' N.$   
Long.  $113^{\circ} 8' E.$

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General chart, 2,661a [2,680].

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PLACE.—MANILA. Obs. A LAT.  $14^{\circ} 35'$  N., LONG.  $121^{\circ} 0'$  E.  
 METEOROLOGICAL TABLE COMPILED FROM TWO TO TWENTY-TWO YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.			TEMPERATURE.			RAIN.			WIND.						Number of Days from 15 years.						REMARKS.						
	Mean Height.	Ex- treme Range.		Mean Daily Range.			No. of Days.	Total Fall.	Mean Amount of Clouds.	No. of Days.	No. of Days.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	15 years.							
		Ins.	○	○	○	○															15 years.							
January -	30.04	0.66	76.9	16.5	92.7	60.1	6.2	1.03	6.4	4.8	6	5	5	5	5	5	5	5	5	5	2	1	2	1	3	3	0	
February -	30.04	0.56	73.2	15.8	93.9	53.1	4.8	0.81	3.2	5.3	3	5	6	3	1	1	2	4	1	1	2	3	3	2	3	0	0	
March -	30.03	0.52	80.6	16.4	98.1	61.2	4.3	0.34	1.2	6.4	1	5	9	4	1	1	3	4	2	2	3	2	3	2	3	0	0	
April -	30.00	0.58	83.1	17.6	102.6	64.9	4.2	1.20	8.6	6.6	1	4	8	6	1	1	3	4	2	2	6	4	2	1	1	0.1	0.1	
May -	20.96	0.61	84.0	16.7	103.6	62.8	5.5	2.13	8.0	6.5	2	3	5	6	2	2	7	3	2	2	3	2	3	2	3	0.1	0.1	
June -	20.93	0.58	83.1	14.8	100.8	66.1	6.8	9.11	14.0	6.5	2	5	5	5	5	5	5	5	5	5	2	3	3	3	3	3	0.3	
July -	20.92	0.58	80.2	14.2	97.0	64.6	7.6	10.87	15.6	7.8	3	5	5	5	3	3	3	11	3	2	2	2	2	2	2	0.3	0.3	
August -	20.90	0.51	80.0	14.3	98.8	64.0	7.1	18.84	18.8	8.1	3	2	2	2	3	3	3	3	3	3	10	4	3	3	3	3	0.7	0.7
September -	20.89	0.65	79.8	14.5	97.2	64.8	8.2	9.98	15.4	7.9	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	0.5	
October -	20.94	1.35	79.6	14.2	92.8	62.6	7.1	7.9	16.6	5.6	5	4	3	3	2	2	2	2	2	2	2	2	2	2	2	1	0.5	
November -	20.97	1.14	78.8	15.1	95.6	61.2	5.9	4.44	10.4	4.4	6	5	3	1	1	1	1	3	3	3	2	2	2	2	3	3	0	
December -	30.01	0.60	77.0	15.7	91.0	64.0	5.3	0.74	3.4	4.2	0	5	4	4	2	2	1	2	2	2	2	2	2	2	2	3	0	
Means and Totals -		30.07	1.11	80.9	15.5	103.6	64.0	6.0	0.62	113.6	0.2	4.5	4.5	4.5	3.8	3.8	3.8	2.0	6.3	4.1	3.0	2.0	2.0	2.0	2.0	2.0	2.0	

PLACE.—BANGKOK. Obs. A LAT.  $13^{\circ} 38'$  N., LONG.  $100^{\circ} 27'$  E.

METEOROLOGICAL TABLE COMPILED FROM TEN TO TWENTY YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to $32^{\circ}$ and Sea Level.			TEMPERATURE.			RAIN.			WIND.						REMARKS.				
	Mean Height,	Ex- treme Range,	Mean	Daily Mean	Max.	Min.	Rain. in. inches	Clouds, in amount, in percentage	Relative Humidity	Number of Days from Average Velocity of Wind.										
										18 yrs.	10 yrs.		19-20 yrs.		11 yrs.					
January	29.985	In.	In.	76.3	°	°	°	59.0	°	0.47	1.1	9	6	5	2	4	3	1	1	
February	-	29.923		79.2	15.1	92.0	58.0		2.7	1.00	3.6	2	3	3	3	10	6	1	0	
March	-	29.890		83.0	14.2	98.0	68.0		3.0	0.70	4.1	1	1	1	1	16	8	1	0	
April	-	29.886		88.8	14.0	97.0	70.0		3.8	2.14	7.9	1	1	1	1	13	8	2	1	
May	-	29.794		88.0	12.4	97.5	72.0		5.7	8.78	17.4	1	1	1	1	12	10	3	1	
June	-	29.770		82.5	11.9	93.0	73.0		5.8	6.68	18.5	0	0	0	0	9	15	4	1	
July	-	29.756		81.6	11.0	96.0	72.0		6.3	6.91	18.9	1	0	0	0	1	9	16	3	1
August	-	29.794		81.6	11.7	98.0	71.5		5.9	6.35	18.2	0	0	0	1	1	7	16	5	1
September	-	29.792		80.6	10.8	94.0	72.5		6.9	11.34	20.9	2	1	1	1	7	11	5	2	
October	-	29.864		80.3	10.6	93.0	69.0		5.6	7.63	15.7	8	5	3	3	5	5	3	2	
November	-	29.918		78.5	12.6	93.0	59.8		3.2	2.48	7.0	16	7	3	1	1	0	0	2	
December	-	29.938		75.3	15.3	91.0	57.0		1.9	0.12	2.7	17	9	2	1	0	0	0	2	
Means and Totals - }		29.863		80.5	13.0	96.5	57.0		4.4	54.80	138.0	68	34	21	21	91	98	28	14	

E 32369.

N N

PLACE.—SAIGON. Δ LAT.  $10^{\circ} 47' N.$ , LONG.  $106^{\circ} 42' E.$

METEOROLOGICAL TABLE COMPILED FROM ONE TO THIRTEEN YEARS\* OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.	TEMPERATURE.			Relative Humidity. Mean Amount of Clouds in Cloudiness.	RAIN. No. of Days Fall.	WIND. No. of Days Gales.	Number of Days from Average Hourly Velocity Wind.						REMARKS.				
		Ex- treme Range.	Mean Height.	Mean Daily Range.				1 yr.			13 yrs.							
								7 yrs.	6½ yrs.	o	Ins.	o	o	o				
January	- 29.939	Ins.	77.8	13.6				0.43	4									
February	- 29.950		82.0	13.8				0.04	2									
March	- 29.975		82.7	14.4				0.24	4									
April	- 29.984		82.9	12.6	97			2.05	21									
May	- 29.920		82.9	13.6				7.01	23									
June	- 29.902		81.0	8.7				9.28	25									
July	- 29.898		81.2	8.3				9.65	24									
August	- 29.902		80.8	7.4				10.00	23									
September	- 29.904		80.2	7.2				10.66	28									
October	- 29.926		80.5	7.6				10.71	20									
November	- 29.982		79.0	6.6				4.76	10									
December	- 30.001		78.2	11.2				2.91	2									
Means and Totals	.9.142		80.8	10.6	97	61		73.72	184									

\* See heads of columns.

PLACE.—HANOI. Obs. A LAT.  $21^{\circ} 1' N.$ , LONG.  $105^{\circ} 48' E.$ METEOROLOGICAL TABLE COMPILED FROM  $\frac{1}{3}$  TO  $3\frac{1}{3}$  YEARS\* OBSERVATIONS.

MONTH.	BAROMETER, reduced to $32^{\circ}$ and Sea Level.			TEMPERATURE.			RAIN.			WIND.						No. of Days Gale.	No. of Days Fogs.	Remarks.					
	Mean Height.	Ex- treme Range.	Ins.	Ins.	Mean.	Daily Mean.	Max.	Min.	Range.	Clouds, %	Relative Humidity, 0 to 100% Hours Velocity,	Total Fall.	No. of Days.	Number of Days from									
	†yr.						14 yrs.																
January	59.7		Ins.	Ins.	°	°	78.1	45.1															
February	61.2				80.4	50.9				0.99	12												
March	65.6				80.8	54.0				2.32	23	9	45	5	28	8	2	3	6				
April	75.7				88.0	55.2				4.40	11												
May	83.8				95.5	63.8				8.31	18												
June	88.2				96.1	81.1				9.96	10	4	12	3	57	7	4	1	12				
July	86.9				95.4	80.2				9.67	12												
August	86.5				93.7	79.2				13.67	16												
September	89.853				83.5	92.8	74.1			8.78	14												
October	30.029				77.7	86.0	61.2			5.40	22												
November	30.043				71.2	87.4	59.4			1.14	6												
December	66.2					82.9	47.7			1.62	4												
					75.6	96.1	45.1			60.22	154												
					Means and Totals																		

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GREENOCK	-	Dobbie McInnes, Ltd.	-	45, Bothwell Street.
"	-	D. McGregor & Co.	-	37, Clyde Place.
HARWICH	-	Camper & Nicholsons	-	Yacht Builders.
HULL	-	R. Love	-	17, West Blackhall Street.
"	-	Dobbie McInnes Ltd.	-	28, Cathcart Street.
GRIMSBY	-	O. T. Olsen	-	Fish Dock Road.
HARTLEPOOL	-	G. Pearson	-	24, High Street.
HARWICH	-	John Groom & Sons	-	Lloyd's Agents.
HULL	-	Newton Bros. & Holliday	Prince's Dock.	
"	-	W. Hakes	-	Commercial Road.
LEITH	-	D. Stalker	-	6 & 8, Commercial Street.
LIVERPOOL	-	Philip, Son & Nephew	-	49 & 51, South Castle St.
"	-	John Parkes & Son	-	18, St. George's Crescent.
"	-	Frodsham & Keen	-	31, South Castle Street.
"	-	John Bruce & Son	-	60, South Castle Street.
"	-	D. McGregor & Co.	-	39, South Castle Street.
LONDON	-	E. Stanford	-	26, Cockspur Street, S.W., and 12 - 14, Long Acre, W.C.
"	-	Imray, Laurie, Norie, & Wilson	-	156, Minories, E.
LONDONDERRY	-	H. Hughes & Son	-	59, Fenchurch Street, E.C.
MARYPORT	-	E. A. Minniece	-	23, Ship Quay Street.
MIDDLESBROUGH	-	Quintin Moore	-	Harbour House.
NEWCASTLE-ON-TYNE	-	Constantine, Pickering & Co.	Docks.	
"	-	M. S. Dodds	-	61, Quayside.
NEWPORT, MON.	-	S. A. Cail & Sons	-	29 & 31, Quayside.
NORTH SHIELDS	-	E. E. Williams	-	94, Dock Street.
OBAN	-	Wilson & Gillie	-	New Quay.
PLYMOUTH	-	Hugh Macdonald	-	"Times" Office, Esplanade.
PORTSEA	-	J. Blowey	-	23, Southside Street.
PORTSMOUTH	-	Griffin & Co.	-	2, The Hard.
QUEENSTOWN	-	C. Groom, Ltd.	-	50, Broad Street.
SOUTH SHIELDS	-	T. Miller	-	1, Harbour Row.
		T. L. Ainsley	-	Mill Dam.

SOUTHAMPTON	- J. B. Thomas <i>Ltd.</i>	- 172, High Street.
"	- J. G. Fay & Co. <i>Ltd.</i>	- 80 & 90, High Street.
SUNDERLAND	- J. J. Wilson & Son	- 18 & 19, Hudson Road.
"	- T. Reed & Co.	- 184, High Street West.
SWANSEA	- T. Martin	- 1 & 10, Somerset Place.
Sub-AGENTS. (Abroad.)		
AMSTERDAM	- L. J. Harri	- Prins Hendrikhade, No. 90.
ANTWERP	- A. M. Flornae	- 20, Nassau Street.
BERLIN	- D. Reimer	- 29, Wilhelm Strasse.
BREMERHAVEN	- W. Ludolph	- 72, Smidt Strasse.
BRISBANE (QUEENS-LAND)	{ Watson, Ferguson & Co.	- Queen Street.
CALCUTTA	- James Murray & Co.	- Government Place.
CAPE TOWN	- Mercer & Skauen	- Dock Road.
CONSTANTINOPLE	- Blair, Campbell & Co.	- British Oriental Bazaar.
"	- John G. Griscti	- Gumuche Han.
GIBRALTAR	- James Molinary	- Shipchandler, &c.
HAGUE, THE	- Van Cleef Brothers	- Libraries.
HAMBURG	- Eckhardt & Messtorff	- Steinhof I.
"	- Thos. Downie	- 9, Stubbenhuk.
"	- Friederichsen & Co.	- 61, Neuer Wall.
HAVRE	- L. Croix	- 13 & 15, Rue de Paris.
HOBART (TASMANIA)	- Walch & Sons	- Merchants.
HONG KONG	- C. J. Gaupp & Co.	- Booksellers.
"	- G. Falconer & Co.	- Queen's Road, Central.
LOURENÇO MARQUES	- A. W. Bayley & Co.	- Booksellers.
MALTA	- Collector of Customs	- Custom House.
MARSEILLES	- G. Santi & Co.	- 6, Rue St. Ferreol.
MELBOURNE	- J. Donne & Son	- 346, Little Collins Street.
MONTRÉAL	{ The Optical and Engineers' Supply Co.	- 1628, Notre Dame Street.
"	- Harrison & Co.	- 53, Metcalfe Street.
NEWCASTLE (N.S.W.)	- W. H. Sproull & Co.	- 99, Hunter Street.
NEW YORK	- John Bliss & Co.	- 128, Front Street.
PARIS	- Augustin Challamel	- 17, Rue Jacob.
PEIRÆUS	- H. C. Decavalla	- Shipchandler.
PORT ADELAIDE	- A. E. Sawtell	- Divett Street.
PORT ELIZABETH	- J. C. Juta & Co.	- Booksellers.
PORT NATAL	- Lewis J. Wilson	- The Point.
"	- W. Storm	- The Point.
PORT SAID	- Vella & Portelli	- Shipping Agents.
QUEBEC	- T. J. Moore & Co.	- 118 & 120, Mountain Hill.
RIO DE JANEIRO	- D. Norris	- 57, Rua do Carmo.
SAINT JOHN (N.B.)	- A. B. Smalley & Son	- 91, Prince William Street
SAINT JOHN'S (NEW-FOUNDRAND)	{ Ayre & Son	- 231, Water Street.
SHANGHAI	- Walter Dunn	- 29, Kiangse Road.
"	- Hirsbrunner & Co.	- 1, Naskin Road.
"	- Kelly & Walsh	- Shipping Agents.
SINGAPORE	- Hon. Sec. and Treasurer	- Sailors' Home.
SYDNEY (N.S.W.)	- Turner & Henderson	- 16 & 18, Hunter Street.
TOKYO* (JAPAN)	- Takata & Co.	- Merchants.
TORONTO (CANADA)	- Charles Potter	- 85, Yonge Street.
TRIESTE	- F. H. Schimpff	- 11, Piazza della Borsa.
VANCOUVER, CITY (B.C.)	Thomson Stationery Co., Ltd.	325, Hastings Street.
VICTORIA (B.C.)	Hibben & Co.	- 66, Government Street.
ZANZIBAR	Port Officer	- Post Office.

\* Note.—The Agents in Tokyo for Japanese charts are the Nippon Yachta Kaihō.







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